Does Employment Limit Engagement in Unpaid Work in Mid to Later Life? Paid Work, Informal Care and Volunteering around the State Pension Age in Britain

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DOES EMPLOYMENT LIMIT ENGAGEMENT IN UNPAID WORK IN MID TO LATER LIFE?

Paid Work, Informal Care and Volunteering around the State Pension Age in Britain

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Statement of Authorship

I, Lawrence Benjamin Sacco, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

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3. Where I have consulted the published work of others, this is always clearly attributed;
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Title of Thesis

Does Employment Limit Engagement in Unpaid Work in Mid to Later Life? Paid Work, Informal Care and Volunteering Around the State Pension Age in Britain.

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One of the things I've heard countless times since starting a doctoral degree is that the PhD is an isolating experience. During the first month at Kings' College London, when I attended various inductions and courses outlining the ins and outs of being a PhD student, I have heard this gloomy warning several times and in various forms. However, while challenges do abound during a PhD, I feel I have been the opposite of isolated, but surrounded by colleagues, friends and family who have been sources of intellectual, professional, and personal support. Despite a PhD can indeed be an isolating experience at times, especially when personal circumstances impinge on it, doing a doctorate granted me the opportunity to meet, work and interact with really amazing people.

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Abstract

Background & Objectives. In light of population ageing, policies aimed at extending working lives have been implemented in several higher income countries, including the UK. However, given older adults' substantial contributions through unremunerated forms of work, such as informal care and volunteering, longer working lives may have repercussions for engagement in unpaid activities, which are important for their economic value and their influence on older people's health and wellbeing.

Using the British Household Panel Survey and its continuation, the UK Household Longitudinal Study, this thesis examined the effect of employment status on engagement in unpaid forms of work in mid to later life (55-70). Two different approaches were used. Firstly, pathways of engagement in multiple activities are examined using two-stage latent class analysis (LCA), to provide a nuanced picture of how individuals combine engagement in paid and unpaid activities over time. Secondly, the longitudinal relationship between employment status and engagement in informal caregiving and volunteering is examined using within-between random effects (WB-RE) models that disentangle direct influences from selection effects.

Results. Findings using two-stage LCA identified three distinct engagement pathways: *paid workers* (43%), *mixed activities (housework)* (46%), and *mixed activities (volunteers)* (11%). *Paid workers* were more likely to work full-time and less likely to engage in unpaid work. Individuals classified in the other two pathways were more likely to combine paid and unpaid activities. Gender differences were conspicuous, as more women conformed to the second and third pathways. Being classified in one of the three engagement paths was associated to baseline sociodemographic and health characteristics.

WB-RE models showed that full-time employment was consistently associated with lower odds of caregiving (any and at least 20 hours per week, hpw), through both within and between person effects. Time-lagged models showed that women who work part-time had lower odds of caregiving 20 or more hpw, while men in full-time self-employment had decreased odds of caregiving at all intensities (between person effects). Among caregivers, full-time employment was associated with lower odds of more intensive caregiving (20 hpw) at follow-up, according to both within and between person effects; additionally, part-time paid work and self-employment were negatively associated with providing more intensive care according to between person effects.

Full-time employment was consistently negatively associated with monthly and weekly volunteering, through within and between person effects. Time-lagged models showed that part-time employment and full-time self-employment led to lower odds of monthly volunteering (within person effects) among men. Part-time employment also led to decreased odds of weekly volunteering. Men who were in part-time self-employment had higher odds of monthly and weekly volunteering (between person effects). Among female volunteers, full-time employment led to lower odds of more frequent volunteering at follow-up (within person effects). Among male and female volunteers, those who were in full-time self-employed had lower odds of more frequent volunteering (between person effects).

Conclusion. Full-time employment led to a lower likelihood of engagement in caregiving and volunteering, with both direct and selection effects driving this relationship. The effect of part-time work and self-employment was mainly mediated through selection effects. Individuals' engagement in unpaid work should be taken into account in the context of longer working lives, as participation in full-time employment limits engagement in informal caregiving and volunteering in mid to later life. Findings have also important implications for active ageing related policies, as they emphasise the importance of gender, socioeconomic and health inequalities as determinants of engagement in paid and unpaid work in later life.

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Abbreviations

Abbreviation	Meaning
ACL	Americans' Changing Lives
AHEAD	Asset and Health Dynamics Among the Oldest Old
AIC	Aikaike Information Criterion
ANOVA	Analysis of Variance
BHPS	British Household Panel Survey
BIC	Bayesian Information Criterion
BLRT	Parametric Bootstrapped likelihood ratio test
CAD	Cumulative Advantage/Disadvantage
CI	Confidence Interval
CPS	Current Population Survey
CSE	Certificate of Secondary Education
DFLE	disability free life expectancy
DWP	Department for Work and Pensions
ECHP	European Community Household Panel
ELSA	English Longitudinal Study of Ageing
EU	European Union
FE	Fixed effects
FIML	Full Information Maximum Likelihood
GAZEL	GAZ and Electricité
GCE	General Certificate of Education
GHQ	12-item General Health Questionnaire
HCH	Healthy Carer Hypothesis
HILDA	Household, Income and Labour Dynamics in Australia
HLE	Healthy Life Expectancy
hpw	hours per week
HRS	Health and Retirement Survey
IB	Incapacity Benefits
LCA	Latent class analysis
LDSV	least squares dummy variable estimation
LE	life expectancy
LMR-LRT	Lo-Mendell Rubin likelihood ratio test
LTC	Long term care
MAR	Missing At Random
MBWF	Male Bread Winner Family
MCAR	Missing Completely At Random
MNAR	Missing Not At Random
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
ONS	Office for National Statistics
ONS-LS	Office for National Statistics-Longitudinal Study
OR	Odds Ratio
OSM	Original Sample Member
PSM	Permanent Sample Member
RE	Random effects
SABIC	sample size adjusted Bayesian Information Criterion
SARs	Sample of Anonymous Records
SD	Standard Deviation
SHARE	Survey of Health and Retirement in Europe
SOEP	German Socio-Economic Panel Survey
SPA	State pension age
TFRs	Total Fertility Rates
TSM	Temporary Sample Member
UK	United Kingdom

UKHLS	United Kingdom Household Longitudinal Study
UN	United Nations
US	United States of America
WB-RE	Within-Between Random Effects
WHO	World Health Organisation

Chapter 1

Introduction

The share of older people is increasing in several higher income countries, as a result of rising life expectancies and falling fertility rates. The unprecedented phenomenon of population ageing has caused concern regarding its social and economic implications, such as the sustainability of pension systems, ageing of the workforce, improving health in later life, and increasing strains on the social care system. The main policy response in the UK (United Kingdom) and elsewhere has been to extend working lives, addressing concerns regarding the fiscal sustainability of pensions (Foster 2018; Vickerstaff 2010). This has been done, in particular, to address increases in the number of potential pensioners in comparison to people in traditional working age groups. The debate regarding longer working lives culminated in the report "Fuller Working Lives" by the Department for Work and Pensions (DWP 2014a). This report emphasised the extent of early retirement in the UK, i.e. people retiring before the state pension age (SPA), suggesting that the employment rate should be increased among people over the age of 50.

However, extending working lives may affect individuals' engagement in unpaid activities that are important to society and for older adults themselves, as participating in these activities enables individuals to have an active role in society (Gonzales *et al.* 2015). People in mid and later life provide substantial contributions to society through unpaid forms of work such as informal care, often provided to older parents or spouses. Indeed, people over the age of 50 are the main providers of informal care according to the UK census (Dahlberg *et al.* 2007; ONS 2011). This is particularly important given that as a result of population ageing and other sociodemographic changes, the demand for long term care in the UK is predicted to increase in the future (Karlsson *et al.* 2006; Pickard 2015), and it relies heavily on the work of informal carers (Kraus *et al.* 2011). Furthermore, engagement in unpaid activities such as volunteering is important for health and wellbeing in later life, considering the strong evidence showing that engagement in volunteer work has the potential to boost health outcomes and promote healthy ageing (Nazroo & Matthews 2012).

Longer working lives may exacerbate socioeconomic and health inequalities. For example, individuals who do not have adequate pensions in later life may need to work in jobs that are strenuous and damaging for health. Longer working lives may also indirectly exacerbate socioeconomic inequalities by affecting engagement in unpaid activities. The blanket approach, taken to increase employment rates in

later life, may increase the conflict between paid work and caregiving roles for those who are more disadvantaged, e.g. women, those from lower socioeconomic groups, and those in ill health. In fact, individuals in more deprived groups are more likely to find themselves caregiving to relatives in later life, due to health inequalities and lower financial resources (Carmichael *et al.* 2010; Glaser & Grundy 2002; Young *et al.* 2005). By contrast, those in higher socioeconomic groups are more likely to be able to exit the labour force when they wish to do so, and partake in health enhancing activities such as volunteering. It is therefore, imperative to understand how paid work in the years leading up to and after SPA affects engagement in unpaid activities, such as informal caregiving and volunteering, and how it affects inequalities in engagement in these activities in later life.

1.1 Aims and Objectives

Previous longitudinal evidence has shown that providing informal care may have a detrimental effect on employment, as carers often need to reduce their involvement or leave the paid labour market altogether (e.g. Berecki-Gisolf et al. 2008; Carmichael & Charles 2003; Carr et al. 2016; Evandrou & Glaser 2003; Principi et al. 2014). However, limited research has examined the opposite relationship, i.e. whether being in paid work may affect the likelihood of providing informal care. Furthermore, most previous studies focused on samples from the general population that included also younger individuals, often excluding those above the state pension age. Even more limited research has examined the link between paid work and volunteering. Moreover, most of these studies use North American samples, with little longitudinal research on this topic in the UK.

The overarching aim of the thesis is to better understand how employment affects engagement in unpaid work in mid to later life using longitudinal data from the British Household Panel Survey (BHPS) and its continuation the UK Household Longitudinal Study (UKHLS) also known as Understanding Society. In this thesis I pursued two principal objectives.

First, mid to later life paths of engagement in multiple paid and unpaid activities (paid work, informal caregiving, volunteering, civic participation, and housework) are examined. Using a person-centred longitudinal approach, distinct patterns of engagement in these activities that differ markedly according to gender, socioeconomic characteristics and health, are uncovered (chapter six).

Second, longitudinal relationships between paid work and engagement in caregiving (chapter seven) and volunteering (chapter eight) in mid to later life are examined. Longitudinal Within-Between Random Effects (WB-RE) models, also known as hybrid models, are used to disentangle selection effects and direct, possibly causal, influences. Selection effects are particularly relevant herein, as those who engage in in caregiving and volunteering may differ systematically according to unobserved characteristics (e.g. personality traits and prior lifecourse experiences) from those who do not. For instance, caregivers and volunteers may be more or less likely to be employed to begin with, earlier in the lifecourse, leading to different labour market attachment in later life (direct selection). Alternatively, individuals may be selected into caregiving and volunteering roles due to other characteristics (e.g. health and socioeconomic factors) that also affect employment status and labour market attachment in later life (indirect selection) (Blane *et al.* 1993). The results show that full-time employment has a consistently negative effect on engagement in the two activities, and the effect seems to be mediated through both selection effects and direct influences. This has important repercussions for the implications of the findings (chapter nine).

1.1 Thesis Structure

The following chapter expounds the background to the research topic. In particular it outlines the demographic causes of population ageing; its consequences on pension sustainability and adequacy, health in later life and social care provision; responses to ageing societies, including extending working lives, active ageing and new model lifecourses; and the contribution of older adults through informal care provision and volunteering in later life.

The third chapter reviews the relevant literature and existing evidence in relation to the research questions. Using a scoping review methodology, the review outlines the determinants of caregiving and volunteering, as well as current knowledge on the relationship between paid work and engagement in the unpaid activities.

Chapter four provides a detailed outline of the theoretical framework and the research objectives. Theories relevant to the study of older adults' engagement in paid and unpaid work, the theoretical framework that guides the research objectives, and the research questions are discussed.

Chapter five outlines the data and methods of the empirical research. Longitudinal data over multiple waves from the BHPS and its continuation, the UKHLS are used for the research. Two-staged latent class analysis is used to examine pathways of engagement in paid and unpaid activities in mid to later life, from the age of 55 to 70. WB-RE models, are used to investigate the longitudinal relationship between paid work and engagement in volunteering and caregiving in mid to later life. This approach provides an insight into the selection and direct influences that affect the relationship of interest, by disentangling between and within person variabilities.

Chapters six to eight outline the findings of the quantitative research. Chapter six, examines the pathways of engagement in paid and unpaid activities in mid to later life. Three distinct pathways are identified: members of the *paid workers pathway* are more likely to participate in full-time paid work for longer, but have very low probability of engagement in unpaid forms of work; the *mixed activities (housework) pathway*, in comparison to the *paid workers* pathway, is characterised by a lower likelihood of engagement in full-time paid work, and higher likelihood of engagement in unpaid forms of work, in particular housework; and the *mixed activities (volunteers) pathway* is characterised by lower participation in full-time paid work, but very high participation in unpaid activities, especially volunteering and civic participation. Additional analyses of these pathways show that they are highly gendered, and are related to baseline demographic, socioeconomic and health characteristics.

Chapters seven and eight show the relationship between paid work and engagement in caregiving and volunteer work. Results show that being in full-time employment is consistently related to a lower probability of engaging in these activities, both for men and women. The results are mediated through both between and within person effects, suggesting that both selection and direct influences mediate this relationship. Results for part-time and self-employment are less consistent, and prospective models seem to indicate that between person effects mediate the effects for these forms of work. This suggests that selection effects rather than the direct influences, underlie differences between those who are not in paid work and those who are in part-time and self-employment.

Finally, the implications of the findings are discussed in chapter nine. The results from the empirical research are discussed in detail in this chapter, and the advantages and limitations are outlined, along with policy related considerations.

Chapter 2

Background

Population ageing, longer working lives and implications for engagement in informal care provision and volunteering

2.1 Introduction

The meanings of old age and retirement have undergone numerous transformations in the UK and elsewhere during the last century, due to demographic changes, increasing life expectancies, social policy and cultural changes. While at the beginning of the 20th century, old age came to be viewed as a protected stage of life through the institutionalisation of retirement, in recent years various reforms have eroded the welfare protections of this group. The 1908 Old Age Pensions Act was the first step towards establishing old age as a phase of life deserving protection from poverty through retirement (Bozio *et al.* 2010; Foster 2018; Macnicol 2015). Further reforms in the post-war period, provided additional protections, leading to a shifting, more positive, image of old age, especially in regards to the mid to later life period often referred to as the third age (Gilleard & Higgs 2000; Laslett 1989). While retirement had become institutionalised as a distinct phase of life by the 1960s, in the past few decades there has been a shift towards different conceptions of later life, whereby engagement in both paid and unpaid activities is expected from older adults (Phillipson 2013). In the wake of ageing populations, longer life expectancies and the rise of "early retirement" in the 1980s, the concept of retirement as a separate lifecourse stage free from paid work has increasingly become a contested terrain (Kohli *et al.* 1991; Phillipson 2013). Current policies agendas, such as extending working lives and active ageing, focus on the promotion of longer working lives and engagement in unpaid activities that are deemed to be productive, such as informal care provision and volunteering (van Dyk 2014; Vickerstaff 2010). Furthermore, changes in forms of employment in mid to later life (e.g. bridge employment and unretirement), indicated that retirement has become a protracted process, rather than a single transition (Cahill *et al.* 2013; Calvo *et al.* 2017; Giandrea *et al.* 2009; Moen 2003; Platts *et al.* 2017).

In this context, this thesis aims to understand how paid work affects engagement in unpaid activities, in particular informal care provision and volunteering, in the years leading up to and following retirement. This chapter expounds the background and the wider context that underlies the research of this thesis: population ageing and its consequences focusing on the UK; extending working live and active ageing policy agendas; changing lifecourse models in the context of longer life expectancies; and engagement in unpaid forms of work in later life. This is required in order to understand the implications of the findings

presented in chapters 6 to 8. This information links directly to chapter nine, where the societal and policy related implications of the doctoral research are discussed. It is important to delineate how policy changes such as longer working lives and active ageing relate to population ageing, and in which ways they may affect older adults' engagement in paid work, volunteering and informal care provision in mid to later life. This will enable a better understanding of the relevance of studying engagement in paid work, volunteering and informal care provision in the years leading up to and following the state pension age (SPA).

In the following section, the causes and characteristics of population ageing, with an emphasis on the UK, are described (section 2.2.1), along with discussions of potential repercussions that ageing populations may have on individuals and societies (section 2.2.2 to 2.2.4). Section 2.3, outlines policy responses and strategies that address concerns spurred by an increasing share of the older population. These include policies that extend working lives, the application of the active ageing framework, and new models of the lifecourse. Section 2.4 discusses the contributions made by older adults through unpaid forms of work, in particular informal care provision and volunteering, emphasising how unpaid work undertaken through these activities is overlooked and may be affected by extended working lives. Finally, section 2.5 summarises the chapter, bringing together all the discussed themes, and provides concluding remarks regarding the knowledge that the empirical quantitative research presented in the following chapters contributes to debates regarding longer working lives and population ageing.

2.2 Population ageing and longer lives: causes and implications

2.2.1 Characteristics of demographic ageing in the UK and its causes

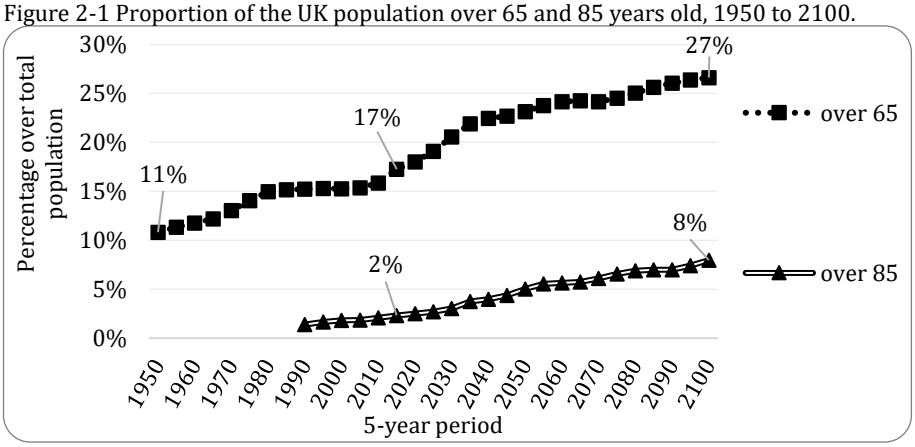
The UN defines population ageing as an unprecedented, global and irreversible phenomenon "without parallel in human history" (UN 2002). Demographically it refers to the increase in the proportions of older people, generally defined as individuals over the age of 65. While this age cut-off is arbitrary and neglects the heterogeneity among older adults, it nevertheless has often been adopted by demographers as a useful measure to compare the extent of ageing over time, and between different countries and regions (Rowland 2009). While other concepts have been developed to capture the heterogeneity among older adults, such as the third and fourth ages (see section 4.2.2), a clear age cut-off is more effective for describing demographic trends of population ageing (Rowland 2009).

Another, threshold often used in the demographic literature is that of 85 to define the oldest-old (Rowland 2009).

The phenomenon of unprecedented population ageing was first noted in Sweden and France at the beginning of the 20th century, when the proportion of people over the age of 65 reached 8% (Myers & Eggers 2007; Sundbärg 1900). However, aside from some interest in the 1930s, related to below replacement fertility in the post-recession period, only after World War II was there an increasing collective interest on population ageing (Myers & Eggers 2007). Despite the focus of this thesis being on the UK, and that research concerning population ageing has overwhelmingly focused on higher income countries, population ageing is a global phenomenon that affects also low and middle income countries (Martin & Kinsella 1994; Shrestha 2000).

In the UK, the proportion of older adults has increased throughout the 20th century and is projected to continue increasing in the future. In 1950, with 11% of people over the age of 65, the UK was the 4th oldest country globally – only nine countries in total had 10% or more of their population over this age (Rowland 2009). Figure 2-1 shows the estimates of the proportion of people over 65 and 85 in the UK from 1950 to 2015, and projections from 2015 to 2100. The proportion of people over the age of 65 reached 17% in 2015, and is projected to increase even further, surpassing 20% before 2050 (UN 2017). According to the Office for National Statistics (ONS), people over 85 are the fastest growing age group, as their relative proportion is expected to more than double by 2050 (ONS 2012).

Figure 2-1 Proportion of the UK population over 65 and 85 years old, 1950 to 2100.



Notes: the graph shows the trend in the proportion of people over 65 and 85 in the UK. The data points after 2015 have been calculated using the UN medium variant projections.
Source: UN, World Population Prospects: The 2017 Revision.

However, while this trend is remarkable, the UK is ageing to a lesser extent and at a slower pace in comparison with other higher income countries. For example, in the UK the median age increased at a slower pace compared to the rest of Europe (ONS 2012). In comparison with the EU-27[1] countries, the UK was the second oldest country in 1985 in terms of the proportion of people over 65, but became the 17th country in 2010, and is projected to become the 23rd in 2035 (ONS 2012). As an extreme comparison, in a number of higher income countries, such as Spain, Italy and Japan, the over 65 age group is projected to make-up over 30% of their populations by 2050 (UN 2017).

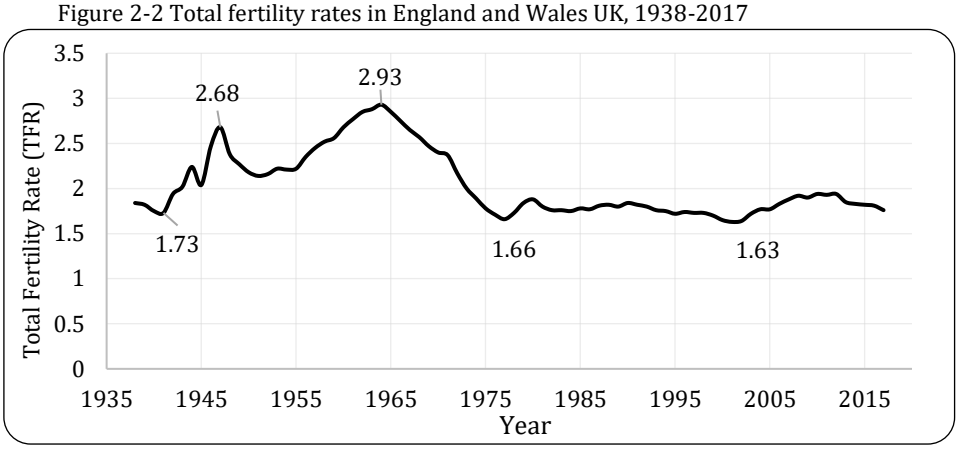
Despite differences in the pace and extent of ageing among countries, there are three common main demographic processes that underlie population ageing: declining fertility, declining mortality at older ages, and past demographic trends (Bloom *et al.* 2015). Migration may also modulate the extent of ageing, although its effect on national populations is quite limited (Coleman 2006; Lesthaeghe 2000). While international migration has been shown to have a small or negligible effect on the extent of ageing in various low-fertility countries, including the UK (UN 2001), internal migration can affect the extent and pace of ageing within smaller subnational regions (Bernard *et al.* 2014; Chen *et al.* 2018; Rodríguez-Vignoli & Rowe 2018).

As noted above, the first and foremost key driver of population ageing is past fertility rates, as fertility declines affect the age structure of a population by decreasing the number of younger people, relative to older ones. Indeed, the countries where ageing is more pronounced are the ones which experienced total fertility rates (TFRs) that are substantially below the replacement level of 2.1. As declining fertility rates lead to an older age structure, it follows that ageing populations are an inevitable consequence of the demographic transition (Dyson 2013), i.e. the historical transition from a high mortality and high fertility society, to a low mortality and low fertility one. The demographic transition model, which assumes that TFRs would decline to near replacement levels at the end of the transition, somewhat naively predict that the proportion of people over 65 would peak at no more than 20% (Rowland 2009). Possibly for this reason, the magnitude of population ageing as an unprecedented phenomenon, was initially

[1] EU-27 refers to the 27 countries that were members of the European Union from 2007 to 2013.

underappreciated (Cowgill & Holmes 1970; Notestein 1954). As actual TFRs plummeted considerably below replacement, the proportion of people over 65 is expected to go considerably beyond 20% in most post-transitional societies. As shown in figure 2-2, fertility rates in England and Wales have been below replacement levels in the 1930s and from the 1970s onwards.

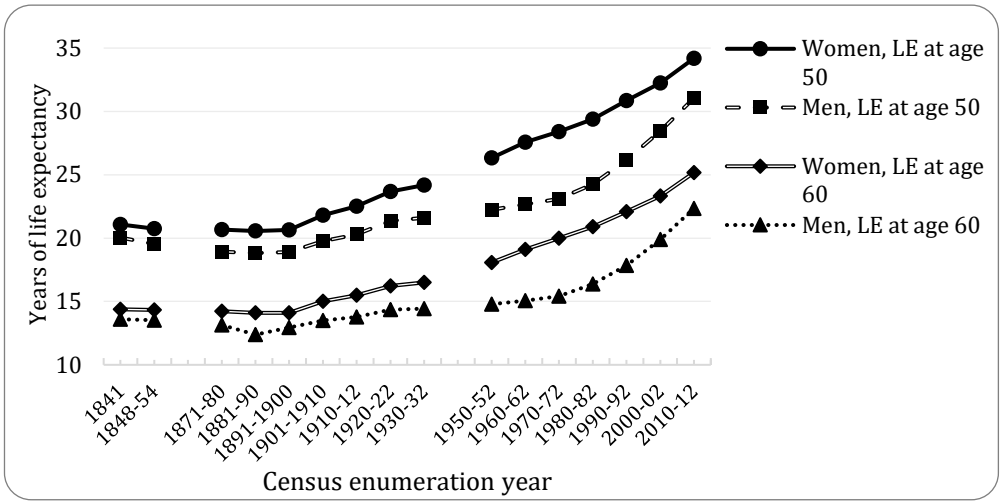
Figure 2-2 Total fertility rates in England and Wales UK, 1938-2017



Notes: the graph shows the total fertility rates for each year for England and Wales.
Source: ONS, 2018. Birth summary tables - England and Wales. Vital Statistics Outputs Branch, Office for National Statistics.

The second key factor determining population ageing is declining mortality, although rising life expectancy at birth may initially have the seemingly counterintuitive effect of making a population's age structure younger. While life expectancy at birth increased considerably during the 19th century and early 20th century in England and Wales, climbing from 42 years in 1850 to 63 in 1930 and 72 in 1950 (ONS 2015), these trends were driven by declines in mortality at younger ages (Meslé & Vallin 2011). As the number of younger people temporarily increased relative to older adults, the English and Welsh age structure became younger rather than older. By contrast, the rise in life expectancy that occurred in the second half of the 20th century, were predominantly driven by mortality declines among older age groups (Luy *et al.* 2011; Meslé & Vallin 2011). Figure 2-3, shows the rises in life expectancy at ages 50 and 60 in England and Wales, which became increasingly rapid after the 1970s, particularly for men (ONS 2015). During the 1960s and 1970s people aged 45 to 65 particularly benefited from mortality declines due to the "cardiovascular revolution", i.e. the reduction in the morbidity and mortality from circulatory diseases caused by medical advances and lifestyle changes (Luy *et al.* 2011; Meslé & Vallin 2011). Therefore, these mortality declines at older ages, contributed to an increasing proportion of people living to progressively older ages.

Figure 2-3, Life expectancies at age 50 and 60 in England and Wales, 1841-2012



Notes: life expectancies for England and Wales at each period when an enumeration of the total population could be estimated – data was lacking for the 1860s and 1870s, and for the 1940s due World War II.
Source: ONS, 2015. English Life Tables. Office for National Statistics.

The third contributing factor to population ageing, which is closely related to the other two, is the historical variation in the patterns of mortality and fertility that determine the relative size of subsequent cohorts within a population (Bloom *et al.* 2015). The combination of previous demographic trends may exacerbate the ageing of a population, as larger cohorts reach older ages. For example, countries that experienced an increase in the number of births in the post-World War II period, are currently experiencing faster ageing, as the larger cohort of "baby boomers", reach older ages. This effect is relevant also for the UK, which has experienced peaks in fertility, with a TFR above 2.5 in 1946 and in the 1960s (figure 2-2). This effect reflects the long-lasting effect of demographic processes on population ageing over generations (Komp & Johansson 2015a).

Population ageing is an unprecedented phenomenon, which is caused by protracted demographic processes and population dynamics. The UK population has already experienced considerable ageing as the proportion of older adults has risen and is poised to increase substantially, especially in the proportion of people over the age of 85 (figure 2-1). Nevertheless, compared to other higher income countries, the pace and extent of population ageing in the UK is not as prominent, as the TFR, while dropping below the replacement levels, has remained higher than, for example, the European[2] average (UN 2017). The following subsections (2.2.2 to 2.2.4) discuss the debates concerning the implications of ageing populations.

[2] The definition of European countries in this case refers to the United Nations regional aggregate definition. The UK has experienced fertility patterns that were similar to those of the northern

2.2.2 The impact of population ageing on the paid labour market and pension sustainability

Concerns regarding the impact of unprecedented population ageing on the workforce and the sustainability of welfare systems have been expressed in the academic literature, media and policy reports (Bloom *et al.* 2010; Bongaarts 2004; Gee & Gutman 2000; Gruber & Wise 2001). The impact of population ageing on welfare states and economic growth has often been controversially painted as the new "demographic time-bomb", which some gerontologists have argued is an exaggerated portrayal of the actual challenges posed by ageing populations (Gee 2002; Timonen 2008 pp. 89). One of the most notable examples of this tendency is the report by the World Bank, "Averting the Old Age Crisis" (World Bank 1994), which recommended substantial cut backs to old-age protections (Beattie & McGillivray 1995). The alarmism connected to population ageing has also fuelled an ageist narrative based on intergenerational conflict (Walker 2012), which propagated particularly in the printed media (Beckett 2016; Howker & Malik 2010; Willets 2010). However, despite the ongoing debates regarding the size of the social and economic impact of ageing, it is generally accepted that population ageing presents challenges and implications for social policy in regard to health and adequate finances in later life (Doyle *et al.* 2009).

A fundamental issue is how to ensure pension adequacy and sustainability as life expectancies increase, and people spend more years in retirement. Pension adequacy refers to the effectiveness of pension provision to adequately protect older adults from poverty and social exclusion, guaranteeing a decent living standard (European Commission 2010). It is particularly important to consider whether current pension systems do not exclude disadvantaged segments of society, in terms of pension adequacy. Individuals who generally experience more discontinuous careers in the paid labour market, such as women, informal carers, self-employed individuals, may be particularly at risk, as they may not accrue savings and income from private pensions (Cridland 2017). However, the provision of adequate pension incomes relies on pension sustainability, i.e. financially

European regional group, and generally higher than the western, southern and eastern European country groups average TFR, as these groups have experienced TFRs below 1.5. Furthermore, the TFR in the UK has also generally been higher compared to the average of the "more developed regions" group, which includes Europe, Northern America, Australia/New Zealand and Japan.

affordable pension systems that do not undermine other fundamental welfare provisions (European Commission 2010). Pension systems need to be sustainable in the long-term period in order to ensure adequate pension incomes in the context of ageing societies.

One of the main concerns and perceived threats regarding pension sustainability is the possibility that population ageing may lead to shrinkages of the workforce relative to the number of pensioners (DWP 2014a; OECD 2006). For instance, the Organisation for Economic Cooperation and Development (OECD) argued that population ageing in the UK, and elsewhere, will lead to labour force shortages that will negatively affect economic activity (OECD 2004). Declining old age dependency ratios show that the number of people active in the labour force is expected to decline relative to the number of potential pensioners, with consequences for the sustainability of pay-as-you go pension systems (Bongaarts 2004; Cracknell 2010). In the UK the old age dependency ratio (the number of people aged 16-SPA by people over SPA) is projected to decline from 3.21 to 2.65 by 2041 (Harper *et al.* 2016).

However, the old-age dependency ratio may also be misleading, as it purports to divide the population into productive from unproductive individuals, without considering contributions made in the informal economy through unpaid labour, e.g. informal care provision, volunteering and housework (Timonen 2008, pp.90-91). Furthermore, this indicator does not account for the fact that participation in the workforce is not merely dependent on age. The dependency ratio is significantly different after late entry into the labour force, unemployment and early retirement are taken into account (Coleman 2006).

Nevertheless, while eschewing exaggerated alarmism about the rising number of older adults through the uncritical scrutiny of old age dependency ratios, demographic ageing carries implications for the sustainability of pay-as-you-go pension systems (Foster 2018; Hofäcker 2015). Economic analysis of the sustainability of the state pension in the UK indicates that even under various scenarios of international immigration, which would mitigate the ageing of the population, fiscal pressure from the state pension will build-up, to possibly unsustainable levels beyond 2020, requiring measures such as postponement of the pension age (Blake & Mayhew 2006).

The phenomenon of early retirement in the UK may also have significant effects on pension adequacy and sustainability, as argued by the Department of Work and Pension (DWP) in the report, "Fuller working lives" (DWP 2014a). Early exits from the paid labour market may cause individuals to retire on an inadequate income. Reducing early retirement would benefit also employers, as they would not lose skilled workers (DWP 2014a). The prevalence of early retirement increased throughout the 1980s and early 1990s, when financial incentives encouraged early exits from the labour market (Blundell *et al.* 2002; Disney *et al.* 1997). While, this trend reversed from the late 1990s, a high proportion of individuals still retire before SPA (Vickerstaff 2010). For instance, the 2013 Labour Force Survey show that levels of employment levels substantially drop before reaching the SPA, as 28% of people aged 50 up to SPA are not involved in the labour force and only 4% are actively seeking work (DWP 2014a). Although this may give the impression that people in their 50s choose to retire early of their own volition, around half of early retirees report that they had been forced to retire (Humphrey *et al.* 2003). Furthermore, the rise of early retirement in the UK may also be a consequence of wider changes in the economy and the paid labour market, which occurred in the 1980s (Macnicol 2015).

However, it is important to recognise the heterogeneity among early retirees, as it has been suggested that there are two distinct groups (McNair 2006; Smeaton & Vegeris 2009). The first group is made-up of individuals who are better off, as they have secured enough pension income before retirement, and therefore are able to exit the labour force early, if they wish to do so. The second group, is composed of individuals from the lower socioeconomic groups, who retire early due to protracted unemployment, redundancy, and more often poor health. These individuals may face additional disadvantages in re-entering the paid labour market after experiencing a redundancy due to lower levels of education, as higher levels of education have been shown to be associated with being in employment in later life. It is also critical to consider health, since worsening health in mid to later life affects labour market participation (Humphrey *et al.* 2003; Naessens *et al.* 2011). A high proportion of workers over the age of 50 suffer from at least one chronic disease, as the incidence of chronic conditions and co-morbidities in the wider population increases markedly past this age (Barnett *et al.* 2012; Munir *et al.* 2005). Also in this

age group musculoskeletal conditions are a leading cause of sickness absences (Smeaton & Vegeris 2009).

2.2.3 Population ageing and health: longer and healthier lives?

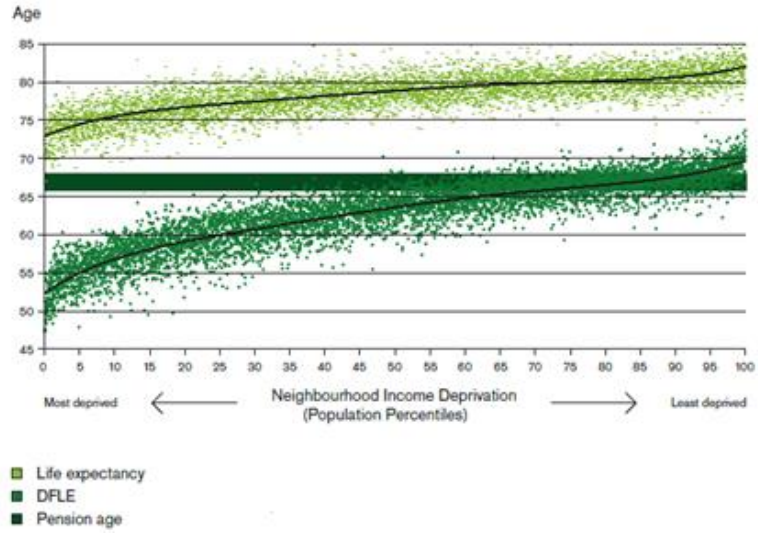
Population ageing may also affect health care systems, as a rising number of older people may cause an increase in the number of people suffering from disabilities and chronic diseases. This is particularly the case if increases in life expectancy (LE) do not translate into similar increases in healthy life expectancy (HLE) or disability free life expectancy (DFLE). In this regard, there are three hypothesised scenarios: HLE keeps up with the pace of rising LE in the *delay of morbidity*; HLE outpaces LE in the most desirable scenario, *compression of morbidity*; and HLE falls short of rises in LE in the worst case scenario, *extension of morbidity*, meaning that individuals spend more time in ill health (Fries 1980, 2003). The extension of morbidity scenario would have implications for extending working lives, since health is an important determinant of working past SPA (Barban *et al.* 2017; Di Gessa *et al.* 2017)

Research testing the delay, compression or extension of morbidity hypotheses have not yielded definitive conclusions, as there is a wide variation according to national contexts, among different social groups and measures of HLE and DFLE (Freedman *et al.* 2002; Fries *et al.* 2011; Perenboom *et al.* 2004; Valkonen *et al.* 1997). However, current evidence from the UK seems to support the extension of morbidity scenario. A review of the evidence suggests that in the UK and other OECD countries (e.g. France, USA, Netherlands and Japan), increases in HLE and DFLE at older ages are falling short of increases in LE, unlike countries such as Belgium, Switzerland and Sweden (Jagger 2015). Research from Public Health England (PHE), shows that for both men and women the numbers of years spent in poor health have increased from 2000-2002 to 2012-2014 (PHE 2017). The obesity epidemic may exacerbate these trends in the future as the prevalence of obesity in England has been increasing (Zaninotto *et al.* 2008), and obese individuals are more likely to have substantially shorter HLE (Stenholm *et al.* 2017).

Furthermore, inequalities across UK local authorities in HLE and DFLE at birth (~16.5 years for women, ~19 years for men) are wider than inequalities in LE (8.5 and 7.5), indicating that the extension of morbidity affects particularly disadvantaged individuals (Jagger 2015). Patterns of unemployment, deprivation and ethnicity contribute to these regional inequalities (Jagger 2015). The fact that

gradients of social inequality in HLE are steeper than those for LE is of concern both for debates on equity and for the feasibility of extending working lives. Figure 2-4, from the report "Fair Society, Healthy Lives", shows patterns of LE and DFLE by income deprivation levels in relation to the SPA (Marmot *et al.* 2010). The graph highlights how inequalities in health are problematic for the extension of working

Figure 2-4 Life expectancy and disability-free life expectancy in England (1999-2000)



Notes: the graph reproduced from the report "Fair Society, Healthy Lives" (Marmot *et al.* 2010) relates LE and DFLE to neighbourhood income deprivation and SPA increases.
Source: Office for National Statistics (2009).

lives, as DFLE for the more deprived neighbourhoods is below the SPA. From the equity perspective this situation has been aptly summarised by Michael Marmot "talk about adding insult to injury: the more deprived people spend more of the their shorter lives with 'disability'" (Marmot 2015, pp.27).

2.2.4 Challenges for social and long term care

Ageing populations and rising longevity have also implications for the financing of social care services, especially as people over 85 years are one of the fastest growing age groups (Colombo *et al.* 2011). The demand for long-term care (LTC) may rise as a consequence of population ageing, especially if increases in LE are not matched by increases in HLE, which appears to be the case in the UK given evidence discussed above (subsection 2.2.3). Furthermore, in parallel to population ageing, other sociodemographic changes may diminish the care provided by informal carers, such as changes in family structure (e.g. family 'verticalisation'), the decline of intergenerational co-residence, the increasing labour market participation of women and increasing geographical mobility (Colombo *et al.* 2011; Ettner 1995; European Commission 2009; Harper *et al.* 2016). For example, the

pressure on informal carers may increase due to past lower fertility rates, as individuals who are currently entering older age groups have had fewer children that may act as carers, compared to previous generations (UN 2002). The increasing demand and pressure on informal carers is a particularly salient issues in countries such as the UK that rely considerably on unpaid care provided by relatives (Kraus *et al.* 2011).

LTC is needed by individuals who depend on others for personal, social and medical matters (Karlsson *et al.* 2006). While LTC may be required by individuals with any disability at any at any stage of the lifecourse, older people over the age of 85 are generally more likely to require LTC. Projections of the requirement of LTC in the UK indicate that the demand for care will be increasing progressively in the future, reaching a peak in 2040 (Karlsson *et al.* 2006). Regarding formal services these projections indicate that the cost of LTC for the UK will grow from £11 billion to £15 billion in 2040, assuming constant prices. More recent projections confirm the increasing demand for informal care. For example, projections on intergenerational informal care from adult children (ages 30-69) to their parents over the age of 65 in England, shows that care supply is expected to fail to meet the demand by 2017, with this gap widening in the future (Pickard 2015). These projections underscore the need to recognise the unpaid contribution of informal carers, given the cost of LTC. As discussed in sections 2.4.1 longer working lives may be particularly problematic for caregivers.

These trends are particularly important for women, as they are often expected to be the primary providers of care. Gender inequalities in this regard still remain, despite an increasing number of men providing unpaid care. Furthermore, as a rising number of women participate in the labour force (ONS 2013c), role conflicts between employment and caregiving duties may have detrimental consequences on women's finances, pension savings, health and wellbeing (ONS 2013b). For example, caregivers may need to reduce their involvement in the labour market in order to accommodate their commitments related to their care related role. Therefore it is important to understand how the rising pressure and need for informal care may affect gender inequalities.

2.3 Responses to the challenges of ageing populations

2.3.1 Living longer and working longer? Extending working lives

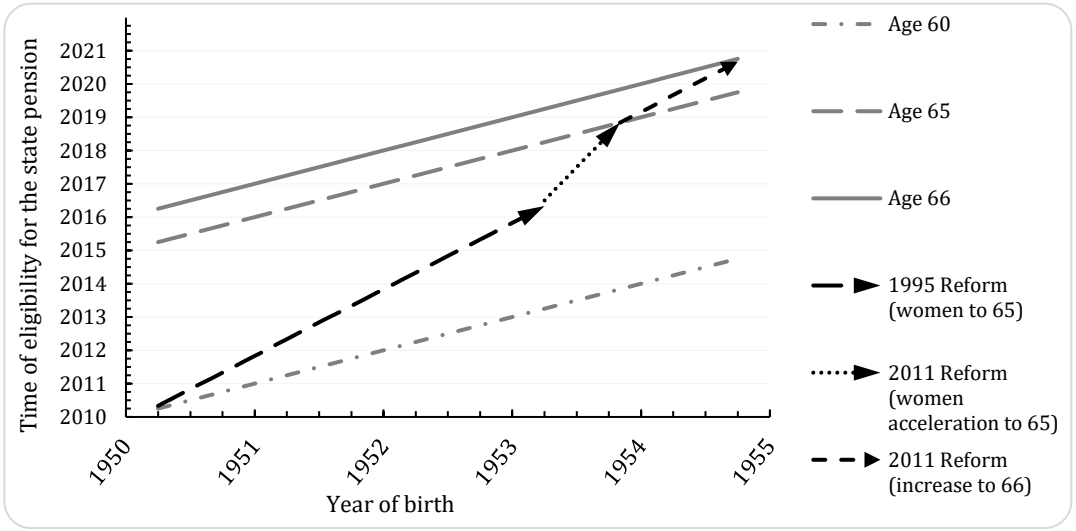
As described in the previous section, while population ageing is a cause for celebration, since it attests to the historical achievement of rising life expectancies, it has also far reaching implications for individuals and societies at large. One implication is how to finance later life, maintaining adequacy and sustainability of pension systems (Berkman *et al.* 2015; Bloom *et al.* 2010; Bongaarts 2004; Maestas & Zissimopoulos 2010). The main policy solutions in higher income countries has been to encourage the extension of working lives (Phillipson 2018; Vickerstaff 2010). Various institutions have promoted the extension of working lives in higher income countries. For example the OECD published 20 country specific reports entitled reports entitled "Live Longer Work Longer" advising that the age of eligibility for state funded pension should be increased in the UK and elsewhere in line with rising LE (OECD 2006). Acknowledging the lower participation in the workforce among people over the age of 50, the OECD recommended various reforms in the UK, including: reducing welfare disability-related benefits, developing labour market activation measures targeted at people in their 50s particularly women, considering increases in the SPA, legislating against age discrimination, and promoting age diversity in workplaces (OECD 2006). Through the Lisbon Treaty, the EU (European Union) has also encouraged older adults' participation to the workforce, by setting the objective of reaching a 50% labour force participation among people aged 55 to 64 within ten years (Ivan-Ungureanu & Marcu 2006). These recommendations from international organisations were mirrored in the UK, as the DWP voiced similar concerns regarding the participation of people in mid to later life - i.e. over the age of 50 circa (DWP 2014b).

In the UK, various policies aimed at increasing the participation of older adults in the labour market have broadly focused on three strategies: delaying the SPA, restricting alternative pathways to early retirement, and opposing job discrimination based on age (Silcock 2012; Vickerstaff 2010). Each of these policy strands is described in more detail below.

The age of eligibility for the state pension in the UK will increase to 68 years of age as a result of various reforms. In the current decade the SPA has been increasing to 66. Figure 2-5, which shows changes in the SPA up to age 66 in relation to the year of birth of those affected, reveals that women have been particularly

affected by these policies. For example, a woman born in the first half of 1950 is eligible for a state pension in 2010, while a woman born approximately four years later is eligible for a state pension in 2020 (figure 2.5), when she is six years older (i.e. age 66 instead of 60). The first reform that postponed the age of eligibility for the state pension is the 1995 Pensions Act, which equalised the SPA of women to that of men, gradually raising the age of eligibility for the state pension from 60 to 65. This reform raised the SPA for women born after the 6th of April 1950 up to age of 65 by April 2020. The pace of this change was accelerated by the 2011 Pensions Act, as the SPA of women born after April 1953 will increase to 65 by November 2018 (figure 2-5).

Figure 2-5 State pension age increases from to age 66



Notes: the graph shows the increases in the state pension age legislated by the 1995 and the 2011 Pension Acts. The increases are the equalisation of women's SPA from 60 to 65, and the subsequent rise of SPA to 66.
Source: Pensions Act 1995, Pensions Act 2011

Further increases occurring in the coming decades affect both men and women. The 2011 Pensions Act raised the SPA from 65 to 66 by 2020 (figure 2.5); the 2007 Pensions Act raised the SPA to 67 for people born between 1969 and 1977, and to 68 between 2044 and 2046; the Pensions Act 2014 accelerated the increase from 66 to 67, which is now scheduled to occur by 2028.

There are proposals to accelerate the increases of the SPA to 67 and 68. In 2016, the DWP commissioned an independent review of the SPA that recommended further increases to the SPA (Cridland 2017). In particular, the review supported an acceleration of the increase of the SPA to 68, which according to the review should occur over a two-year period starting in 2037, and further increases should be of one year, every ten years. Additional proposals in the review by Cridland include the

withdrawal of the "triple lock" as pensions should be uprated only by earnings, and not by prices or the 2.5% minimum rise; and introducing flexibility for people in poor health and with caregiving responsibilities, by permitting them to receive the state pension one year earlier than the SPA, once the SPA will have been increased to 68 (Cridland 2017).

As well as postponing the SPA, reforms have also restricted pathways for early retirement, which, as discussed in subsection 2.2.2, is a large phenomenon in the UK. For example, the Welfare Reform Act 2007 attempts to retain people in mid to later life in the labour market by reducing the availability of incapacity benefits (IBs), which were used to support those who were not fit to work due to illness or disability, providing a source of income in early retirement (Smeaton & Vegeris 2009). The large number of individuals aged 50 to SPA that were claiming IBs or other unemployment support benefits was identified as a challenge by current governments (DWP 2006). The Welfare Reform Act 2007 implemented changes to the IB, by replacing it with the Employment Support Allowance, which, through the Personal Capability Assessment places conditionality to financial support for those who are sick or disabled (Piggott & Grover 2009). This reform was introduced as part of the New Labour's Welfare to Work strategy, along with the introduction of the Jobcentre Plus, with the objective of increasing participation in the workforce (Smeaton & Vegeris 2009). Subsequent governments followed a similar approach, implementing cuts to welfare in order to increase the supply of labour (Garthwaite 2011).

However, while this policy strategy attempts to reduce the financial burden of early retirement by increasing employment and reducing expenditure on benefits such as IBs, this approach has also been highly criticised for several reasons: it focuses solely on the supply of labour, ignoring demand (Garthwaite 2011); it may exclude and stigmatise disabled individuals (Grover & Piggott 2013); it appears to be ineffective in its aim to increase employment in practice (Warren *et al.* 2014); and it may have had a detrimental effect on population health (Barr *et al.* 2016). For instance, the use of Personal Capability Assessments was independently linked to an increase in suicides, self-reported mental health problems, and prescriptions for antidepressants in England between 2010-2013 (Barr *et al.* 2016).

The third policy strategy used to extend working lives is to act on working conditions and age discrimination practices that affect older adults' employment

(Vickerstaff 2010). Historically, retirement related policies in the UK were developed to protect older adults, but provided few rights in regards to employment (Lain 2015). This is in contrast to the USA, where pension policies emphasise self-reliance, as protection of old age through welfare is lower and employments rights are stronger, such as the rejection of mandatory retirement ages (Lain 2015). From the 2000's pension policies introduced in the UK also emphasised employment rights for older adults. The Employment Equality (Age) Regulations 2006 bans discrimination based on age for recruitment, job promotion and training and gives the right to employees to request working beyond the default retirement age of 65 (Smeaton & Vegeris 2009). In 2011, further legislation abolished the default retirement age altogether (Foster 2018). However, employment protection legislation may have counterproductive effects on the employability of older people as it raises the cost of employment, possibly making employers averse to hiring older adults (Heywood & Siebert 2009). Initiatives to improve working conditions in the context of population ageing have also been implemented with the objective of adapting workplaces for older adults (Humphrey et al. 2003 pp.12-13). For instance, the Age Positive initiative provides guidance to employers regarding the recruitment, training and retention, and flexible working arrangements for older people (DWP 2013).

In order to understand whether extending working lives is a viable policy direction in response to the challenges of an ageing population, it is pivotal to consider whether older people are willing to work longer and how they wish to retire: whether through an abrupt "cliff-edge" transition or through phased retirement (i.e. reducing hours or working part-time in a bridge-job). Evidence supports the idea that people above age 50 favour flexible work arrangements (Vickerstaff 2010). A survey among people aged 50-69 found that there was a strong preference to work part-time among those considering to work for longer, and that approximately half of the retirees stated that they would have considered working for longer if they had flexible work options (McNair 2006). Moreover, a high number of older individuals reported that they would take into consideration being involved in paid or unpaid work after the retirement age (McNair 2006; Vickerstaff 2007, 2010). This indicates that work is viewed positively by a large proportion of older people and that availability of flexible work arrangements may help increase the participation of older people in the work force. However, there are marked

differences among older people according to demographic and socioeconomic characteristics (Vickerstaff 2010). Indeed, it has been argued that pension and labour market related policies should recognise the heterogeneity of the older population (McNair 2006; Vickerstaff 2010). The concept of "two nations in retirement" has been used to describe this heterogeneity: a group of wealthier and privileged individuals with more rewarding jobs has more choice regarding their retirement, whereas the disadvantaged segment of society, which has poorer health, is constricted in terms of retirement choices (Titmuss 1955).

However, the willingness of older workers is not all in determining whether working lives may be extended. The opinion of employers on an older workforce also matters, as van Dalen put it: "Of course, older citizens must be willing and able to work, but whether they actually get the opportunity mainly depends on employers' decisions" (van Dalen *et al.* 2010b). Research has shown that in some instances European employers may have opposing views regarding older employees (van Dalen *et al.* 2010b, 2010a). This suggests that employers may not be a driving force for extending working lives, but rather a resisting one. However, this may be valid only in certain contexts. In fact, the UK was found to be an exception, as British employers seemed to have a more positive outlook regarding older workers (van Dalen *et al.* 2010b). It was found that British employers were more favourable regarding their current employees working to later ages than Greek, Spanish, Hungarian and Dutch ones. British and Hungarian employers were more likely to positively view the recruitment of older people, while Dutch and British employers were more likely to have a positive attitude to part-time work being used as a bridge to full-time work and retirement (van Dalen *et al.* 2010b). In addition, a further study in the Netherlands suggested that both employees and employers rate the productivity of older workers as being lower (van Dalen *et al.* 2010a). This is of particular importance as it has been shown that employees are more likely to work for longer if their employers support their decision to do so. As research has documented that hiring practices may potentially discriminate against older applicants (Heyma *et al.* 2014), further research may yield insights onto why employers may be against hiring and employing older workers, and whether the findings that UK employers are more favourable towards older workers is universal in all occupations.

2.3.2 Active Ageing: a holistic approach to ageing populations

Extending working lives policy agendas have a restricted focus as they only deal with some of the social and economic implications of population ageing, namely workforce shrinkage and the sustainability of pension systems, without directly addressing the issues of health in later life and long-term care. Indeed, longer working lives may actually exacerbate the challenges for health and social care in later life. For example, remaining in the workforce in a job with poor working conditions may lead to worse health in later life (Barban *et al.* 2017; Kubicek *et al.* 2010). Extending working lives may also reduce the pool of potential informal carers, as remaining in paid work for longer may come at the cost of engagement in informal care provision, as individuals have limited time outside their working hours (Carmichael *et al.* 2010; Young & Grundy 2008).

The Active Ageing framework provides an alternative, holistic, policy strategy to deal with the challenges posed by ageing populations, as it aims to promote activity and social participation in later life through paid and unpaid activities, improving population health in later life and throughout the lifecourse. The original active ageing framework was developed by the World Health Organisation (WHO), as part of UN World Assembly on Ageing, which was held in Madrid in 2002 (WHO 2002). The WHO definition of active ageing is as follows:

> "Active ageing is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age. […] The word "active" refers to continuing participation in social, economic, cultural, spiritual and civic affairs, not just the ability to be physically active or to participate in the labour force. Older people who retire from work and those who are ill or live with disabilities can remain active contributors to their families, peers, communities and nations." (WHO 2002, p.12)

Since the aim of active ageing is not confined to promoting participation in paid work at older ages, it addresses multiple challenges related to ageing including the promotion of: engagement in paid work at older ages (addressing pension adequacy and sustainability); participation in unpaid activities such as caregiving (increasing the number of informal carers); and social participation and an active lifestyle throughout the lifecourse (improving health in later life) (Foster 2018). Active ageing defines as activity any pursuit that enhances wellbeing, such as informal care and volunteering, considering these on an equal footing with paid employment (Foster & Walker 2013).

In keeping with its holistic approach, the WHO active ageing framework emphasises three "pillars" that should guide the focus of national policies. First, the health pillar, refers to the minimisation of health risks and enhancement of

protective factors throughout the lifecourse in order to improve later life health. Second, the participation pillar specifies that activity should be promoted in accordance to individuals' "human rights, capacities , needs and preferences" (WHO 2002, p.46), through labour market, education, health related and social policies. Finally, the security pillar, denotes the rights of older adults to be protected, including financial security and access to care services (WHO 2002). Therefore, the WHO's active ageing framework provides a vision for policy making that holistically addresses individual and societal concerns related to older populations, unlike policies that extend working lives.

However, the active ageing concept has also attracted ample criticism, as its definitions and meanings have often been ambiguous (Boudiny 2013; Pike 2011; van Dyk 2014). International organisations, such as the EU (European Union) and the OECD, and national governments have reformulated the concept of active ageing in ways that are arguably incoherent and have strayed away from the original WHO formulation (Foster & Walker 2015; Timonen 2016 pp.42). For example, the conceptualisation of active ageing by the EU has a considerably narrower focus, emphasising mainly the objective of extending working lives and increasing employment among older adults. The EU emphasised active ageing as a goal to reap the benefits of an older society, as 2012 was designated the "European Year for Active Ageing and Solidarity between Generations" (EU 2012). In practice its recommendations have gravitated mainly around workforce participation, through the aforementioned Lisbon treaty objective of reaching 50% employment among the 55 to 64 years old, and the Europe 2020 objective of reaching 75% employment among the 20 to 64 age group (Barbier 2012). Foster and Walker, while they praise the active ageing concept as the "foremost policy response to the challenges of population ageing" presenting "a more holistic, lifecourse-oriented approach", emphasise that in practice it has taken a more "productivist perspective", which prioritise participation in the workforce (Foster & Walker 2015). This ambivalence regarding active ageing is widespread in gerontological literature, as an inclusive and holistic meaning is contrasted with a productivist denotation, which emphasises increasing participation in the labour market without addressing structural inequalities that act as barriers to ageing actively (Boudiny 2013; Deeming 2009; Ervik 2006; Foster & Walker 2013, 2015; Lloyd *et al.* 2014; Mendes 2013; Paz *et al.* 2018; Pike 2011; Stenner *et al.* 2011; Timonen 2016).

Similar considerations can also be made at the national level in the UK, as policy ideas emphasise a comprehensive holistic strategy for active ageing, but in practice the focus often remains on activation of older adults in the paid labour market. For example, a comparative study of the British and Norwegian approaches to active ageing shows that the UK government had a much more comprehensive approach to active ageing (Ervik *et al.* 2006). This is evident in the DWP report "Opportunity age: meeting the challenges of ageing in the 21st century", which outlined strategies that encompass multiple sectors and branches of governments, including employment, health, housing, transport, education, volunteering (DWP 2005). However, in practice active ageing policies in the UK, compared to Norway, were less inclusive within each sector and emphasised measures that implemented reductions in expenditures to public costs, leaving little space for positive investments (Ervik 2006).

In practice, reforms related to active ageing in the UK have primarily focused on increasing participation in employment, rather than implementing the comprehensive approach of the WHO (Foster 2018). For example, the approach taken by recent UK governments does not guarantee security in later life, one of the three active ageing pillars, such as individuals in poor health and with caregiving commitments risk retiring early without an adequate retirement income (Foster 2018; Price *et al.* 2016). The tendency of UK policy in this regard has been to emphasise individual responsibility regarding health and financial security in later life (Deeming 2009; Lloyd *et al.* 2014). For example, policies implemented as part of the personalisation of social care, pursued from 2007 by the Labour and Coalition governments, reflected the narrower application of active ageing, leading to the widespread use of personal budgets and direct payments for services, and to the closure of day centres (Lloyd *et al.* 2014).

While active ageing in theory represents a comprehensive approach to ageing populations and its challenges, in practice its meaning and implementation has been less clear. In particular, policies to extend working lives and implement cuts to social services as part of the retrenchment of the welfare state have been implemented as part of the active ageing agenda (Boudiny 2013; Pike 2011). While active ageing as conceptualised by the WHO promotes the health and wellbeing of older people through activity in domains other than paid work, simultaneously this framework may be in direct contrast with the current political will to increase

participation in the labour market at older ages. Increasing older people's labour market participation and promoting active ageing may not be compatible strategies, as these are being implemented to achieve different objectives: achieving fiscal and pension economic sustainability (Bongaarts 2004; DWP 2014a; Hicks 2012; OECD 2006), and improving health and wellbeing at later ages (Foster & Walker 2015; WHO 2002). The tension between the extending working lives approach and the active ageing framework, with the former being favoured by reforms in the UK and elsewhere, reveals an additional tension: that between participation in paid work and engagement in unpaid activities, such as informal care provision and volunteering. While the active ageing framework values both paid and unpaid activities, the extending working lives approach ignores the latter, as emphasis is placed on employment in mid to later life, particularly above the ages of 50 and 55. In section 2.4, I describe how older adults are involved in informal care provision and volunteering, underscoring how engagement in these forms of unpaid work can be beneficial for older adults themselves, as well as for society at large.

2.3.3 Is the traditional tripartite lifecourse still relevant in the context of population ageing and longer working lives?

Ageing populations also raise concerns regarding the relevance of the traditional tripartite lifecourse, as longer lives may require a reorganisation of the timing of education, work, and economic inactivity across the lifecourse. The traditional tripartite lifecourse model, that became widespread during the 20th century, is divided into an earlier stage of education (infancy and youth), a middle stage of paid employment (adult years), and a later life characterised by retirement (later life) (Kohli 1986). This organisation of the lifecourse has particularly characterised the period of "Fordist capitalism", whereby men typically had blue-collar full-time continuous careers, while women experienced low levels of employment (Macnicol 2015, p.22). This has also been called the "male breadwinner - female homemaker model" division of labour (Creighton 1999). It is often argued that in the context of longer working lives and population ageing, the tripartite lifecourse is not only outdated, but that it is also unaffordable for welfare states. As stated by Doyle and colleagues:

> "The welfare state is based on a life course that no longer matches current experience. It assumes that people, or at least men and unmarried women, spend their early years in education and then go on to a long period in work followed by a short period in retirement, when they live off the pension accumulated while in work or, more usually, the tax and pension contributions of those still in work. At a time when many people did not survive to draw their pensions or, if they

did, survived for only a few more years, welfare systems coped reasonably well. It is less clear whether they will be able to do so in the future." (Doyle *et al.* 2009)

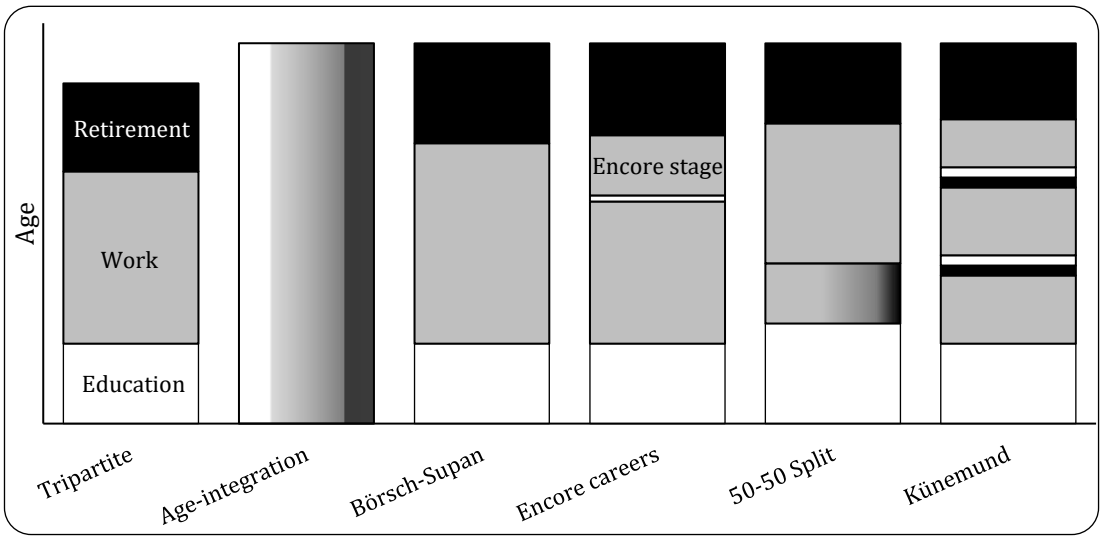
The postponement of the age of retirement and the individualisation of the responsibility of later life financial security affect the institutionalised tripartite lifecourse, especially in the transition from the second (adult years and work) to the third stage (old age and retirement) that is becoming progressively blurred (Künemund & Scherger 2015). This is also exacerbated by further predicted increases in the life expectancy of around three years per decade (Vaupel 2010). These changes fuelled concerns regarding fiscal sustainability and financial security in old age. Policies and measures taken to adapt to these trends, such as extending working lives, may however increase social inequalities (Künemund & Scherger 2015). It is therefore pivotal to consider how the future organisation of the lifecourse might be changed, as this affects individuals' engagement in paid and unpaid work throughout the lifecourse.

Figure 2-6 shows graphical representation of various lifecourse models. The leftmost is the traditional tripartite lifecourse that emerged in the 20th century (Kohli 1986). However, this lifecourse model has not always been the norm, as only for a limited period during the 20th century this was the most common experience, with research suggesting that lifecourses have become more de-standardised (Brückner & Mayer 2005; Calvo *et al.* 2017; McMunn *et al.* 2015). Furthermore, the tripartite lifecourse model is mostly representative of male lifecourses, as it does not acknowledge the distinct experience of women. Female lifecourses are generally characterised by more variability, with possible career breaks of different lengths due to childrearing (Corna *et al.* 2016; McMunn *et al.* 2015), and a different experience of retirement due to the higher likelihood of engagement in unpaid forms of work (e.g. caregiving and housework) that continue in later life (Loretto & Vickerstaff 2012).

Given that the age boundaries of the tripartite lifecourse have become less relevant, a possible alternative model would be the age-integrated lifecourse, whereby age boundaries are abolished (figure 2-6, second column). A change in this direction has been favoured by some gerontologists, such as Riley and Riley (1994) who have advocated for an age-integrated society, as it would address ageism and outdated age norms that are present in our society. However, this is also an overly simplistic model, as age norms do serve some important functions in our societies, especially for the organisation of work (Kohli & Künemund 2002). For example, an

age-integrated society would require the return of child labour. In addition, the removal of age boundaries would lead to more individualisation, with the possible unintended side effect of rising inequalities (Künemund & Scherger 2015).

Figure 2-6 Lifecourse models graphical representations



Notes: graph loosely adapted from Künemund & Scherger (2015), with the addition of the encore careers and 50-50 split model, which have been represented using the authors' descriptions of these lifecourse models in (Carstensen 2009; Freedman 2007).

The proposed model by Börsch-Supan directly addresses the issue of increasing life expectancies, which is the main demographic reality that has spurred debates on the renegotiation of the lifecourse. This model (figure 2-6, third column) simply argues that two thirds of the "years added to life" should be distributed to paid work, and one third to retirement (Künemund & Scherger 2015). This proposal reflects current policies that wish to extend working lives. However, the model's limitations are that it does not address the large inequalities in life expectancy and healthy life expectancy, which would mean that the outcome of such lifecourses is likely to be rising inequalities and social injustices. Also, similarly to the tripartite lifecourse, this model does not allow for the flexibility of women's varied lifecourses.

A variant of the extended working life model by Börsch-Supan, is that of the encore careers, which has been discussed mainly in North America (Flood & Moen 2015; Freedman 2007; Moen & Flood 2013). Building on the idea of the "third age" (Laslett 1987, see section 4.2.2), Freedman devised the idea of encore stage as a second career, which would consist of participation in paid work after a career re-evaluation, allowing individuals to pursue a more meaningful occupation, according to the individuals' preferences and ideals (Freedman 2007). While the initial formulation of the concept envisaged only paid work as an encore career, other

authors have considered also volunteering as a possible encore engagement (Moen & Flood 2013). Individuals would utilise their skills and experience accumulated in the second career, in order to engage in work that is more rewarding and beneficial. The encore stage would occur after a break of around one or two years, in order to allow a period of rest at the end of the first career and for retraining, if necessary. Interestingly, there are some parallels with the mid-life MOT proposed by the Cridland review of the state pension age (Cridland 2017). Freedman emphasises that such a change would allow longer working lives to become a choice rather than an obligation, especially if implemented with financial incentives, "the carrot", rather than disincentives, "the stick", which currently includes extending working lives policies, such as raising the pension age and cutbacks to welfare spending (Freedman 2008, p.182-183).

Laura Carstensen and Harald Künemund have proposed even more transforming lifecourse models (figure 2-6, fifth and sixth columns), that are particularly relevant herein as they include consideration for flexibilities that partially address individuals' engagement in unpaid work. The fifty-fifty split model proposes that the main changes should not occur in later life, but earlier in the lifecourse, between the transition from youth to adulthood (Carstensen 2009). The main period for education and learning would be expanded into the mid-twenties, and the first career would allow for more flexible working arrangements (e.g. longer parental breaks and part-time work), in order to allow engagement in unpaid work and childrearing for both men and women (Carstensen 2009). This first career would last until the forties, allowing for build-up of social and human capital while participating in the labour market. The second career, would be a delayed career, peaking in the 50s, hence the name of the model. Retirement would therefore be substantially delayed.

Künemund proposes a model whereby the added years of increased longevity are distributed throughout the lifecourse and age boundaries are blurred by introducing flexibility in regards to the timing of education, paid work and rest from paid labour (Künemund & Scherger 2015). Following the main period of education in youth, the career in paid work in adulthood would be subdivided in different spells that allow for breaks made-up of further education and economic inactivity. The redistribution of periods out of the labour market during adulthood would allow for retraining, lifelong learning periods, career changes, caregiving

commitments and rest to maximise health (Künemund & Scherger 2015). This model may also be more effective at reducing inequalities; for example, by financing breaks from paid work through public funding, in order to ensure that all social groups would reap the benefits of a flexibilised lifecourse (Künemund & Scherger 2015). The change would also favour gender equality, as it would allow everyone to enjoy breaks from the workforce for childrearing and caregiving commitments, making "interrupted careers" the novel benchmark (Künemund & Scherger 2015).

There are extensive practical difficulties for the implementation of the fifty-fifty split and Künemund's models. For example, the models would extend working lives well into the 70's, when chronic conditions and co-morbidities are more common. In addition, financing of periods not spent in full-time work would require extensive changes to pension and welfare systems. Nevertheless, as noted by the authors, these lifecourse models, serve the purpose of showing the existence of possible alternatives for the re-organisation of the lifecourse that differ from merely extending working lives and removing social protections, with the potential for rising inequalities (Carstensen 2009; Künemund & Scherger 2015).

The fifty-fifty split, Künemund's, and partially the encore career, models acknowledge the existence of contributions made through unpaid work, such as caregiving and volunteering. This is critical considering that extending working lives may negatively affect individuals' engagement in these two activities. As discussed in section 2.2.4, the supply of informal carers is predicted to become a critical issue in upcoming decades in the UK, underscoring the importance of including caregiving in new consideration of lifecourse changes. The following section outlines the issue of engagement in caregiving and volunteering in later life, in the context of extended working lives.

2.4 Caregiving and volunteering in later life: older adults' contributions through unpaid work

As discussed in section 2.3 the main policy response to the challenges of population ageing has been to extend working lives, and promote wider participation in the paid labour market in mid to later life. The main concern of these policies is the fiscal sustainability of ageing populations, especially in relation to the increase of potential pensioners, relative to people in the working ages. However, policies implemented to extend working lives and increase older adults' participation in paid work assume that older adults' contributions to society are

confined to the paid labour market, overlooking work performed in unpaid activities, such as the provision of informal care and volunteering.

The traditional definition of productive activity, i.e. any activity that adds to valued goods and services, has been agued to misrepresent the societal contribution of older adults, as they are assumed to disengage from productive roles in later life (Dosman *et al.* 2006; Fast *et al.* 2006; Fernandez-Ballesteros *et al.* 2011; Herzog *et al.* 1989). A long held ageist assumption is that older adults become unproductive after they retire from paid work, becoming mere consumers who are exempt from contributing through paid work. However, this is far from the truth as older adults make substantial contributions to society through unpaid activities, such as informal care and volunteering (Fast *et al.* 2006; Fernandez-Ballesteros *et al.* 2011; Herzog *et al.* 1989; Waring 1999).

It is pivotal to consider whether participation in paid work at older ages has a negative effect on older adults' engagement in unpaid activities. Indeed, working longer may restrict individuals' ability to undertake unpaid activities. For instance, individuals who retire early may do so in order to provide informal care. Older adults, who can afford to exit the labour market, may also prefer to participate in unpaid forms of work, such as volunteering, which they may find more rewarding. As individuals' time is limited, engagement in paid work may affect the time available to undertake unpaid activities.

Engagement in informal care provision and volunteering in later life is fundamental for individuals, as engagement in these activities provides a sense of purpose in later life as discussed by the activity theory (section 4.2.1). While these considerations regarding the link between engagement in unpaid activities in later life and health, are prominent in the WHO's active ageing framework, as discussed above (section 2.3.2), the application of this framework has been restricted on extending working lives in the policy sphere.

2.4.1 Who will care? The contribution of informal carers

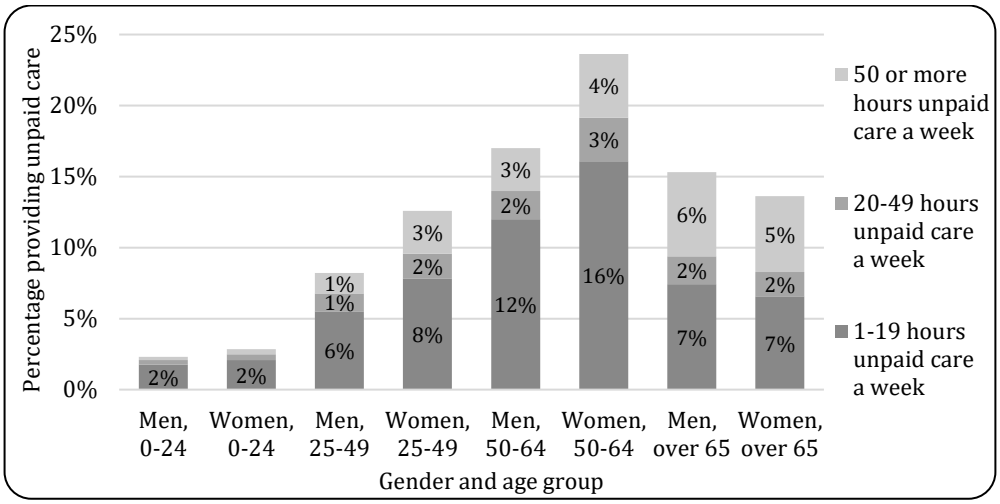
Extending working lives may have a detrimental impact on other societal contributions made through unpaid activities, such as informal caring. Examination of the factors that affect older adults' likelihood of providing care is important due to current sociodemographic trends (section 2.2.4), which may lead to a shortage of people available to provide informal care. As shown by projections, the supply of informal caregivers will decline, while the demand for care will increase in the

future (Kraus *et al.* 2011; Pickard 2015). Existing evidence already indicates that caregivers are less likely to be active in the workforce. A systematic mapping review of the literature of the factors affecting employment in later life found that caregiving obligations are a potential barrier to extended working lives, as individuals may not be able to combine engagement in these two activities (Edge *et al.* 2017).

Even though informal care is not a remunerated form of work, the contribution of carers for the economy is fundamental from an economic standpoint, as the cost of providing the same services through formal care services would be substantial (Buckner & Yeandle 2015; Carmichael *et al.* 2014; Hollander *et al.* 2009; Karlsson *et al.* 2006). The fact that informal care is an unremunerated activity that is performed in the private domestic sphere, may cause the societal contribution of older unpaid carers to be to be particularly "overlooked and undervalued" (Carmichael *et al.* 2014). The quantified contribution made by informal carers to the UK economy in 2015 has been estimated to be £132 billion per year – as a reference this is close to the annual expenditure for health, £134.1 billion per year (Buckner & Yeandle 2015). Furthermore, the economic contribution of informal caregivers has grown by 7% since 2011, mainly due to caregivers providing more hours of care, and partially also due to the rising cost of homecare (Buckner & Yeandle 2015).

The contribution of older adults is particularly important as they are also the most likely group to be engaged in this activity. Data from the 2011 England and Wales census show that people over 50, particularly women, are the main providers of informal care (Figure 2-7). Women and men aged 50 to 64 are the groups are more likely to provide informal care compared to other groups. The proportion of people carers declines among people over 65, but among these age groups a higher proportion of individuals provides more hours of care per week (figure 2-7). The population of carers is particularly large and diverse. Longitudinal analysis of turnover rates of caregiving in the British Household Panel Survey (1991-1998) show that providing any informal care at some point in one's life is a very common experience, with one third to one half of the sample providing at least twenty hours of care per week at least once (Hirst 2002). Furthermore, according to the England and Wales 2011 census the number of unpaid carers has increased by 600,000 since 2001, reaching 5.8 million (Dury 2014).

Figure 2-7 – Percentage of England and Wales population providing informal care



Source: 2011 Wales and England Census, Office for National Statistics. Retrieved from the ONS using NOMIS

More flexible working arrangements may be needed in order to allow informal carers to remain in the workforce for longer and be able to provide informal care at the same time (Henz 2006; Porcellato *et al.* 2010). While previous evidence shows that caregiving may negatively affect the labour force participation of individuals, as caregivers may need to reduce or leave employment (see section 3.5.1), further research is needed to understand the opposite relationship, i.e. whether paid work may have a negative effect on caregiving. Research in chapters 6 and 8 provide additional evidence regarding this matter. As employment has a detrimental effect on individuals' likelihood of providing care, there are substantial implications for policies that extend working lives as they may exacerbate the lack of carers in the context of an ageing population.

2.4.2 Volunteers to the rescue of ageing societies?

There is increasing attention on the promotion of volunteer work among older adults, as it would allow to reap the double benefit of improving society through volunteers' instrumental contribution, and improving health, as volunteering has been shown to be associated with numerous health benefits (Cattan *et al.* 2011; Commission on the Voluntary Sector & Ageing 2015; Rabin 2014). Particularly in the USA various gerontologists have been vocal in advocating for the promotion of volunteering among older people to achieve a "generative society", i.e. that fosters intergenerational solidarity and a commitment to care for the next generation (De St. Aubin *et al.* 2004). In some instances, some of these researchers have actively started programs to implement this vision (Butler 1975; Freedman 1997; Moustakerski 2014).

Older volunteers would serve a dual purpose. First, they would challenge ageist stereotypes that view older adults as unproductive and retirement as a period that is merely dominated by leisure. Second, they would benefit society economically, and by increasing social capital given growing concerns regarding its generational decline (Putnam 1995a). A widely cited paper by Marc Freedman (1997), went as far as proclaiming that through engagement in volunteer work "senior citizens could save civil society". In order for older volunteers to rescue society against social and demographic challenges, Freedman states that institutional support would be required to implement programs that would, for example, allow older adults to aid children in educational settings (Freedman 1997).

These ideals came to influence concepts such as productive ageing (see section 4.2.3) and form the rationale underlying the "Experience Corps" (Glass *et al.* 2004). This programme, which has been designed as an intervention trial, utilises the volunteering potential of older people to improve educational outcomes in schools, while at the same time promoting healthier ageing through engagement in social and cognitively stimulating activities. Initial results from a pilot randomised trial confirmed the feasibility of this program and its potential beneficial impact on health (Fried *et al.* 2004). A dual trial study further assessed the potential of this programme to affect both health outcomes for older people as well as educational ones for school children (Fried *et al.* 2013; Gruenewald *et al.* 2016).

Also in the UK, engagement in volunteer work has been widely promoted in the past two decades, under the influence of the active ageing framework, although such initiatives have not been as targeted to older individuals as in the USA. During the 2000's, the then labour government was determined to expand the volunteering and charity sectors, under the umbrella term of the third sector. This was done through the institution of the Office for the Third Sector in 2006, with the aim of managing a diverse number of activities through volunteer work (Alcock 2011). The third sector initially managed activities directed to older people, such as provision of support and social care services (Deeming 2009). After the new third sector was accused of not keeping up with the modern challenges posed by an ageing population, new initiatives that emphasised active ageing were launched, such as promoting lifelong learning and promoting opportunities for volunteering during retirement (Deeming 2009). During the coalition governments, efforts to expand the remittance of volunteer work continued, in the context of cutbacks to services, as

part of the strategy that was termed "the Big Society". This entailed increasing the level of engagement in volunteering, as well as charity donations, and promoting the transfer of public services to the third sector (Mohan 2011).

The approach of the Big Society strategy has been criticised as it seems to reach for an unrealistic expectation of what voluntary organisations can provide, especially in deprived communities (McCulloch *et al.* 2012; Mohan 2011). Furthermore, the focus of the third sector shifted towards increasing employment rates among young people, as volunteering was seen as an avenue to increase employability among those who have been unemployed (Kamerāde 2013). As stated in the DWP report "No one written off: reforming welfare to reward responsibility", voluntary action was directed towards employment, reskilling and younger people:

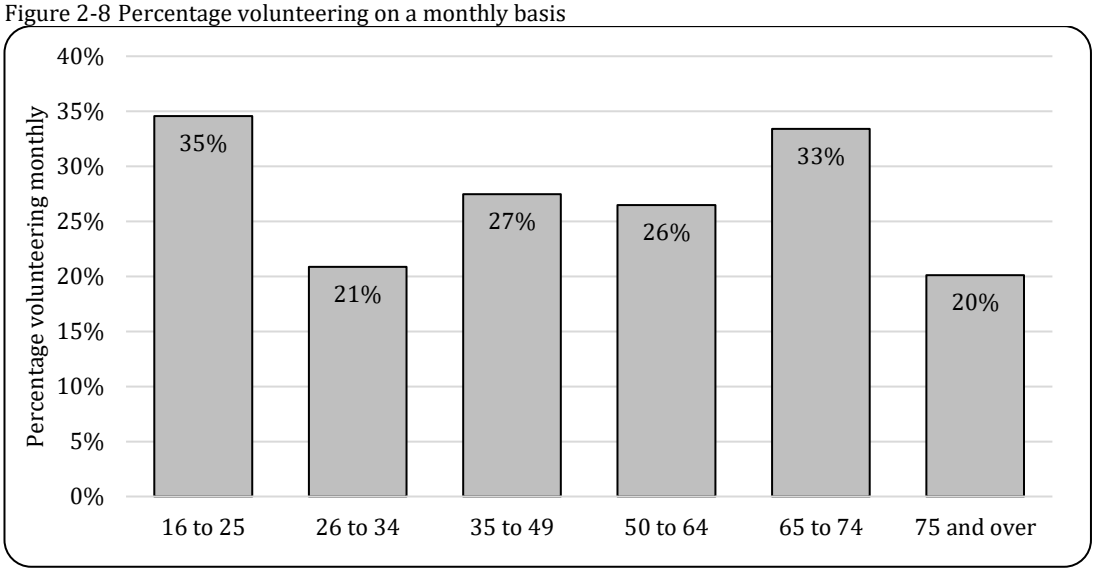
> "Voluntary activity can have many advantages for unemployed people as well as the wider community. It can help keep them in touch with the labour market. It can offer opportunities to obtain the skills and experience that can make moving into work easier. These benefits were emphasised by the Morgan Inquiry on volunteering and young adults." (DWP 2008)

Therefore, engagement in volunteering work in the UK has not had the same development as in the USA where it became acknowledged as a post-retirement activity through which older adults could benefit younger generations and themselves. While research has extensively examined the potential for volunteering to promote better health, initiatives regarding volunteering in the UK have mostly focused on improving employability of unemployed individuals and expanding the reach of volunteer organisations to provide services affected by cutbacks.

Nevertheless, older adults' contribution through volunteering is substantial. Figure 2-8 shows that older adults are as likely as other groups to engage in volunteering. Among people aged 65 to 74, 33% report that they volunteer on a monthly basis, which is second only to the 16-25 age group. Furthermore, the 50 to 64 age group is as likely to volunteer as people in the 26 to 34, and 35 to 49, age groups. Ample evidence shows that volunteering has a positive effect on health and wellbeing, which is of great importance for the promotion of health in later life. Several studies link volunteering to better health and wellbeing outcomes, although earlier studies were mostly cross-sectional. A meta-analysis of thirty-seven studies evaluating the effect of volunteering on the wellbeing of older adults, indicated that 69.8% of volunteers had higher life satisfaction than non-volunteers, albeit the large majority of the studies considered were cross-sectional (Wheeler *et al.* 1998). Furthermore, a subsequent systematic review concluded that the mostly cross-sectional studies "showed overwhelmingly that, at least under certain

circumstances, volunteering has a salubrious effect on volunteers" (Casiday *et al.* 2008). More recently, longitudinal evidence has ruled out reverse causality and,

Figure 2-8 Percentage volunteering on a monthly basis



Source: Community Life Survey 2014-15

in part selection effects, as explanations for the relationship between volunteering and health outcomes (Choi *et al.* 2013; Glass *et al.* 1999; Griep *et al.* 2015; Jenkinson *et al.* 2013; Li & Ferraro 2005, 2006; Mendes de Leon *et al.* 2003; Nazroo & Matthews 2012; Potočnik & Sonnentag 2013; Wahrendorf *et al.* 2008; Zaninotto *et al.* 2013). Nazroo and Matthews (2012), reported beneficial effects of volunteering using data from the English Longitudinal Study of Ageing (ELSA), concluding that, considering previous research and Bradford-Hill's nine criteria for causality, "there is strong evidence supportive of a causal interpretation of the relationship between volunteering and well-being in later life". Furthermore, additional evidence shows that volunteering can act as a buffer when individuals experience stressful life events, such as widowhood and job loss (Griep *et al.* 2017; Li 2007; Sugihara *et al.* 2008).

Different perspectives and mechanisms have been used to explain how volunteering may promote better physical and mental health. First, volunteering is thought to affect several essential components of wellbeing, as engagement in volunteer work provides a channel to boost self-esteem, self-confidence and increase life-satisfaction by giving a sense of achievement and purpose (Moen *et al.* 1992; Warr *et al.* 2004). The volunteering literature, emphasises that this effect is particularly relevant for older adults (Musick & Wilson 2003; Wilson 2000), as volunteering can "inoculate, or protect, [older adults] … from hazards of retirement,

physical decline and inactivity" (Fischer & Schaffer 1993). In this sense volunteering substitutes for employment so that individuals maintain a sense of purpose in later life. This is in accordance with the activity theory of ageing which prescribes post-retirement engagement in activities such as volunteering to maintain the activity levels of middle ages, in order to achieve successful ageing (Havighurst 1954, 1961). Second, volunteering can specifically tap into wellbeing because of its altruistic nature, which can further the sense of realisation that individuals gain from it, by enhancing status and self-esteem (Potočnik & Sonnentag 2013; Warr *et al.* 2004). Third, volunteering can enhance an individual's social network, as volunteer work offers opportunities to form new relationships and maintain existing ones. Finally, volunteering may enable older adults to remain physically active and improve health behaviours, e.g. smoking, physical exercise (Griep *et al.* 2015; Jenkinson *et al.* 2013). Further research is needed to understand the possible effects of extending working lives on engagement in volunteering, given the large contribution of older adults to contribute through this unpaid activity.

2.5 Conclusion

Herein, current knowledge on population ageing and its consequences has been reviewed. This chapter provides an overview of the responses to the challenges of an ageing population. In the policy sphere two main approaches exist. First, extending working lives policies aim at increasing the labour market participation among people in their 50s and 60s. These policies are narrow in focus as they only deal with the challenge of pension sustainability, without addressing inequalities that may arise due to longer working lives. Furthermore, these measures assume that older adults' contribution to society is restricted to the paid labour market, ignoring work performed through unpaid activities, such as informal care provision and volunteering. Extending working lives may have the unintended effect of decreasing older adults' participation in these activities. Second, the active ageing framework has been devised by the WHO as a more holistic approach to population ageing as it acknowledges older adults participation in activities other than employment. However, in its practical application, active ageing policies have mostly focused on extending working lives. In addition, increasing longevity and population ageing may have repercussions on the organisation of the lifecourse, with important implications on engagement in paid and unpaid forms of work. Given the current context of longer working lives, it is critical to understand how paid

work in mid to later life, i.e. the years leading up to and following retirement, may affect engagement in informal care provision and volunteering. Engagement in these activities can be beneficial for both individuals themselves, in order to promote healthy ageing, and society in general. The following chapter reviews current evidence on the relationship between paid work and engagement in informal care provision and volunteering.

Chapter 3

Literature Review
Engagement in Informal Care Provision and Volunteering: determinants and relationship with paid work

3.1 Introduction

Throughout the lifecourse individuals engage in various remunerated and unremunerated activities, such as paid work, informal care provision, and volunteering (Flood & Moen 2015; Morrow-Howell *et al.* 2014). Previous research showed that there is a complex interplay between paid work, caregiving and volunteering, as engagement in any one of these activities can promote or restrict engagement in any other one. For example, those who are in the labour market may have greater access to opportunities to engage in volunteer work compared to those not in paid work (Carr & Kail 2012). This may be due to people in employment having higher human capital or being in contact with social networks that facilitate volunteering. However, as individuals' time is limited, engagement in one activity may restrict the time individuals are able to allocate to other roles. For instance, providing informal care to a sick spouse or parent may have a negative impact on the ability to participate in the labour market and vice versa given time constraints (Jolanki 2015).

While research studies from disparate disciplines, such as gerontology, demography, sociology and economics, have examined how employment affects engagement in informal caregiving and volunteering, there are considerable limitations to this research. First, a large portion of previous evidence on this topic is based on cross-sectional analyses (e.g. Burr et al. 2007; Caro & Bass 1997; Chambré 1984; Fernandez-Ballesteros et al. 2011; Gautun & Hagen 2010; Hank 2011; Hank & Stuck 2008; Kobayashi et al. 2018; Mergenthaler et al. 2018; Principi et al. 2014; Van Der Meer 2006; Vlachantoni 2010). This is especially the case for research on volunteering, where there are few longitudinal studies that investigate the impact of paid work, and most of these are based on short panels often using only two waves. While several longitudinal studies on caregiving have already been conducted, most of them analysed the impact of informal care provision on paid work (e.g. Carmichael & Charles 2003b; Henz 2004; Lee & Tang 2013; Van Houtven et al. 2013) rather than the other way round (Carmichael *et al.* 2010; Mentzakis *et al.* 2009; Young & Grundy 2008), which is the relationship of interest for this thesis. Several studies reported that carers are more likely to reduce participation in paid work or leave employment altogether (e.g. Carr et al. 2016; Crespo & Mira 2014; Brown et al. 2014; Van Houtven et al. 2013). However, other studies reported weak or non-significant relationships (Ciani 2012; Mooney *et al.* 2002), or that reverse

causality mechanisms and selection effects (i.e. carers are less likely to participate in paid work to begin with) may affect this relationship (Heitmueller 2007; Leigh 2010; Pavalko & Artis 1997). Longitudinal evidence is therefore needed to understand whether being in paid work may affect the likelihood of providing care.

Second, most previous studies that examine the effect of employment on engagement in unpaid activities, caregiving in particular, did not focus on older adults, often excluding individuals who are past traditional retirement ages (Carmichael & Charles 2003b; Griep *et al.* 2015; Heitmueller & Inglis 2007; Mentzakis *et al.* 2009; Michaud *et al.* 2010; Principi *et al.* 2014; Wilson & Musick 2003). This is often done even knowing that the relationship between employment and engagement in caregiving and volunteering may differ among individuals who are near the typical ages of retirement. Nevertheless, it is critical to examine engagement in caregiving and volunteering among those in mid to later life, considering that a large proportion of adults over the age of 50 participate in these activities, as shown in chapter two (figures 2-7 and 2-8). Expanding current knowledge into how paid work affects engagement in caregiving, and volunteering among older adults would provide an insight into how extending working lives may affect participation in these unremunerated forms of work.

Third, previous research reported variations in the relationship between paid work and unremunerated activities according to employment status (part-time, full-time and self-employment) and hours worked, especially for volunteering (Nazroo 2015). For example, when comparing part-time and full-time paid workers, people who work part-time are more likely to volunteer for more hours (Choi 2003; Herzog & Morgan 1993; Kobayashi *et al.* 2018). Therefore, research that distinguishes type of employments (e.g. part-time, full-time and self-employment) is needed in order to fully comprehend how paid work affects volunteering in later life.

Finally, most studies evaluate how pairs of activities (e.g. paid work and informal care, or paid work and volunteering) relate to each other. However, this may be simplistic as individuals engage in multiple activities simultaneously (Morrow-Howell 2010). Some studies, mainly from the US, indicate that along with associational studies on pairs of activities, it is important to consider paid and unpaid engagements collectively in order to understand the nuances of engagement in later life (Burr *et al.* 2007; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014).

This is particularly important as older adults may undergo changes to their levels of engagement due to the higher likelihood of retiring from paid work, declining health and widowhood. Only a small number of mostly cross-sectional studies examined people's engagement in multiple paid and unpaid activities using cluster or latent class analysis (Burr *et al.* 2007; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014).

The aim of this chapter is to provide a scoping review of previous research that is relevant to the relationship between paid work and engagement in informal caregiving and volunteering in mid to later life. The research gaps and limitations of previous evidence are outlined, highlighting how these are addressed by the research presented in this thesis (chapters 6 to 8). The following section (section 3.2) describes the methodology used for the scoping literature review. Section 3.3 and 3.4 provides an overview of the demographic, socioeconomic and health characteristics that have been linked to engagement in informal care and volunteering in later life. Such a review of the determinants of caregiving and volunteering is important for two main reasons. First, it highlights the relevance of volunteering and informal care provision for understanding gender, socioeconomic and health inequalities. Second, it provides insights into the mechanisms that may drive an individual's engagement in informal caregiving and volunteering. An assessment of the relationships between these factors and engagement in informal care provision and volunteering has guided the choice of independent variables that are included in the empirical models as potential confounders in chapters 7 and 8.

Section 3.5 examines previous evidence on the relationship between paid work and engagement in informal caregiving and volunteering, focussing particularly, but not exclusively, on older adults. While research using samples of older people is most relevant to understand the interplay between employment, caring and volunteering in the context of longer working lives, studies that utilise samples with younger individuals are included in this review. This is because much of the previous literature on volunteering and informal care is not specifically concerned with retirement or older adults. Thus, this body of work still provides important information to understand the interplay between paid work and engagement in volunteering and caregiving within the lifecourse. The research gaps identified in these literatures are outlined in detail: subsection 3.5.1 focuses on informal care provision; subsection 3.5.2 focuses on volunteering; subsection 3.5.3

centres around studies that examined older adults' latent profiles of engagement in multiple activities. The conclusion (section 3.6), provides a summary of the literature review and expands on how the research gaps are addressed in chapters six, seven and eight.

3.2 Scoping literature review methodology

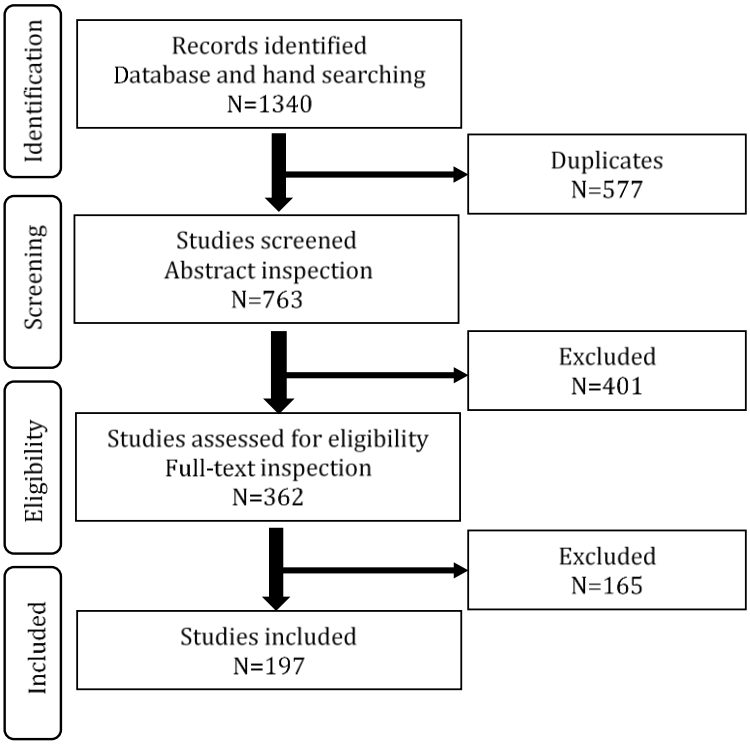
A scoping review methodology has been followed for this literature review. The term "scoping literature review" was first defined by Mays et al (2001) and further outlined by Arksey and O'Malley (Arksey & O'Malley 2005). It refers to the process of mapping the concepts and themes of an existing literature in a given field of research, examining the size of the literature, the types of study (qualitative, quantitative or mixed-methods), and the research designs used (cross-sectional, longitudinal or controlled trials) (Arksey & O'Malley 2005; Pham *et al.* 2014). The objective of a scoping literature review is to summarise and/or disseminate research findings, and identify research gaps (Arksey & O'Malley 2005; Pham *et al.* 2014). In comparison to a systematic review, which is generally aimed at answering a narrow specific research question, a scoping review focuses on a broader topic and evaluates a research area where multiple types of study designs and evidence quality are involved (Arksey & O'Malley 2005). Scoping reviews are particularly suitable when reviewing literature that has considerable breadth (Pham *et al.* 2014). This approach is ideal for the research topic of this review, given the large variability in the types of studies on informal care provision and volunteering. In the literature on these unpaid activities, different sample sizes and composition (e.g. different age groups), statistical approaches, and types of variables and outcomes (e.g. some studies focusing on retirement as a cliff edge variable, others focusing on a specific period) have been used. Furthermore, research on the broader determinants of volunteering and informal care provision was reviewed.

The terms "carer*", "caregiver*", "caregiving", "informal caring", "care", "volunteer*", "volunteering", "volunteer work" were searched, also in combination with the terms "determinants" "health" "paid work", "employment" "working longer" "extending working lives [or life]", "older", "later life" using the Boolean operator "AND". The following databases were queried: ASSIA (ProQuest), MEDLINE (Ovid), PsycINFO (Ovid), PubMed, Social Care Online, Social Policy & Practice (Ovid), and Web of Science. The databases were searched from October 2014, with the review being updated periodically up to the 10th of August 2018. In

addition hand searching was also done throughout this period, through peer reviewed journals publishing gerontological research, and also on the web in general to identify relevant research reports published by organisations such as the International Longevity Centre (e.g. Holley-Moore et al. 2017; Nazroo & Matthews 2012). Furthermore, the reference lists of identified articles were scanned for other relevant studies. Initially, relevant studies were compiled in an endnote library, selecting the relevant studies regarding the relationship between paid work and engagement in informal care provision and volunteering. In autumn 2015 the literature review material was moved to a digital library on the Mendeley software (Elsevier).

The results of the literature review process are shown in figure 3-1. During the first stage (identification), 1340 articles were identified in literature databases and through hand searches. After these records were checked for duplicates, 577

Figure 3-1 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) flow chart of the study selection



577 redundant articles were removed. The abstracts of the remaining 763 articles were examined during the second screening stage (screening), leading to the exclusion of 401 non-relevant articles. The full text of the remaining 362 articles was inspected during the third stage (eligibility), in order to assess the research and

select the studies that are relevant for the topic of the review. Thus, only original research articles regarding the relationship between paid work and engagement in informal care and volunteering, and the determinants of engagement in these two unpaid activities were included. Finally, 197 articles were selected to be included in the review.

These articles were classified in the seven groups shown in table 3-1. Three subcategories are included for both informal care provision and volunteering: studies providing information on demographic and socioeconomic determinants (reviewed in sections 3.3.1, 3.3.2, 3.4.1, and 3.4.2); studies on the relationship with health and wellbeing (reviewed in sections 3.3.3 and 3.4.3); and studies on the relationship with paid work (reviewed in sections 3.5.1 and 3.5.2). A seventh category was formed by a small distinct group of five studies, that examined engagement in paid work, informal caregiving, volunteering, and in some cases also other unpaid activities, at the same time, using cluster and latent class analyses approaches. These studies are reviewed in section 3.5.3. In table 3-1, the percentages of studies in the groups do not add up to one hundred per cent given that each study could be relevant to more than one group. For instance a study may have examined how both informal care provision and volunteering affect health (McMunn *et al.* 2009; Potočnik & Sonnentag 2013), or how demographic, socioeconomic, health characteristics and paid work affect engagement in one of these unpaid activities.

Table 3-1 Grouping of the selected studies into key areas

Review themes	n	%
Informal care provision, relationship with:		
Demographic and socioeconomic determinants	25	13
Health characteristics	83	42
Paid work	52	26
Volunteering, relationship with:		
Demographic and socioeconomic determinants	43	22
Health characteristics	22	11
Paid work	26	13
Engagement in multiple activities	5	3
Total	197	

Notes: the percentage do not add to 100, as some studies may be classified in more than one theme

3.3 Who provides informal care? Demographic socioeconomic, and health characteristics

Before reviewing current evidence on the relationship between employment and engagement in informal care provision and volunteering (section 3.5), this and

the following section consider the individual characteristics of those who engage in informal care provision and volunteering, respectively. Demographic (gender, age and marital status), socioeconomic (education, income, tenure) and health characteristics are taken into consideration as factors that affect engagement in caregiving and volunteering in later life. These factors may all be potential confounders in the relationship between paid work and engagement in informal caring and volunteering. Reviewing this literature, will also provide background information on what may drive engagement, and the implications of informal care and volunteering for gender, socioeconomic and health inequalities in later life.

3.3.1 Demographic characteristics of informal carers

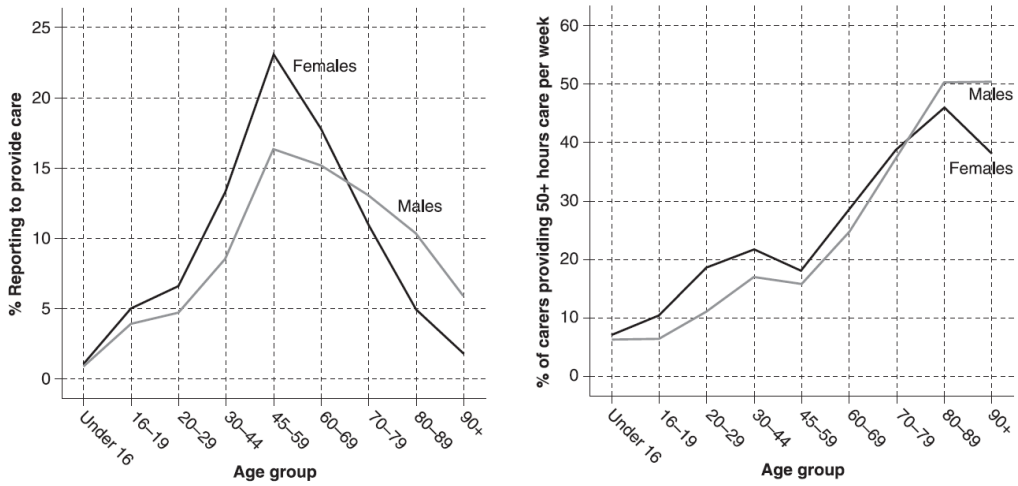
Ample research has examined gender differences in regards to informal care provision, as generally more women provide informal care than men (Agree & Glaser 2009). In the UK, the 2011 census, showed that 12% of women and 9% percent of men reported that they provide unpaid care to "family members, friends, neighbours or others because of either long-term physical or mental ill-health/disability" or "problems related to old age" (ONS 2011). Other surveys and population based samples have also consistently reported that more women provide unpaid care than men in various countries including the UK (Agree & Glaser 2009; Dahlberg *et al.* 2007; Do *et al.* 2014; Dosman *et al.* 2006; Hank 2011; Jacobs *et al.* 2014; Vlachantoni 2010; Wahrendorf *et al.* 2006, 2008). For example, findings from the Survey of Health and Retirement in Europe (SHARE), show that women have approximately 50% higher odds of providing informal care than men, even after potential confounders are accounted for (Hank 2011). The larger propensity of women to provide care is also seen within families, as they are more likely to provide care to ailing relatives. For example, research in the US (United States of America) shows that daughters are more likely than sons to provide filial care for their parents (Dwyer & Coward 1991; Matthews & Heidorn 1998).

Men and women also differ in the intensity, frequency and the type of caring support that they provide (Arber & Ginn 1995; Campbell & Martin-Matthews 2003; Dwyer & Coward 1991). Arber and Ginn (1995) showed that women are more likely to provide help with personal care tasks, such as assisting with personal hygiene and bathing; provide more hours of care per week; and be the main carers. Some studies also identified different styles of informal care reflecting gender norms (Campbell & Martin-Matthews 2000, 2003; Coward & Dwyer 1990; Stoller 1990).

For instance, Campbell and colleagues distinguish traditionally male (e.g. home and financial management), gender neutral (e.g. transportation, shopping) and traditionally female (e.g. laundry, cooking, toileting, personal tasks) caregiving (Campbell & Martin-Matthews 2003). Although men generally perform predominantly traditionally male caregiving tasks, in the presence of stronger filial obligations men's propensity to perform gender neutral and traditionally female tasks is increasing (Campbell & Martin-Matthews 2003).

Gender differences in care provision vary with the age and marital status of carers. Men and women's propensity to provide informal care increases with age, reaching a peak in mid to later life, and with women being more likely to provide informal care at all ages except after the late 60s (figure 3-2). Findings from the Sample of Anonymous Records (SARs) from the 2001 UK census (figure 3-2, left hand side graph), show that in the 65 and over age group, more men provide care than women, reversing the trend observed at younger ages (Dahlberg *et al.* 2007).

Figure 3-2 Percentage providing any and 50 hours per week of care by age and gender in the UK



Source: reproduced from Dahlberg, L., Demack, S., & Bambra, C. (2007). Age and gender of informal carers: a population-based study in the UK. Health & Social Care in the Community, 15(5), 439–445.
Data from 20001 Sample of Anonymous Records (SARs).

The gender difference reverses after age 65, as men are more likely to be married while women are more likely to be widowed, as they generally marry older men and have longer life expectancies. The right-hand side graph (figure 3-2) shows that this effect is also relevant for the hours that men and women dedicate to caregiving, as female carers are more likely to provide more than 50 hours per week of informal care at all ages, except at older ages where the gender difference reverses. Furthermore, marital status may also exacerbate the gender division of caregiving labour, as gender differences in the provision of informal care are stronger among

married carers, indicating that within couples women are more likely to assume the caring role (Arber & Ginn 1995).

Finally, cohort differences may also affect the likelihood of providing informal care, although these might be conflated with age patterns, due to the difficulties of disentangling age-period-cohort influences (Smith 2008). Cohort membership could also confound the longitudinal relationship between employment status and engagement in informal care and volunteering, as individuals' propensity to engage in these activities may be affected by historical changes in the demographic composition of the population, cultural values, and social policies. Older adults born in later cohorts may face increasing pressures to provide informal care to a family member due to demographic changes such as changes in family size, increases in life expectancy and the decline in co-residence among children and parents (Agree & Glaser 2009; Colombo *et al.* 2011; Evandrou & Falkingham 2000; Grundy 2000; Haberkern *et al.* 2011; Pickard 2015). Therefore, it is critical to control also for cohort differences in longitudinal multivariate analyses, despite difficulties in disentangling age and cohort effects.

3.3.2 Carers' socioeconomic characteristics

Limited research has examined socioeconomic inequalities according to carer status in depth; therefore current knowledge on this aspect is mainly derived from bivariate associations reported by studies that focus on other dimensions of caregiving, such as research examining the effect of caregiving on health or employment. Various studies report that informal carers are more likely to belong to more disadvantaged socioeconomic groups (e.g. lower education, income and occupational social class, housing tenure, and ethnic minority group) than non-carers (Buyck *et al.* 2013; Carmichael *et al.* 2010; Choi *et al.* 2007; Cohen *et al.* 2017; Heitmueller 2007; O'Reilly *et al.* 2008; Sacco *et al.* 2018; Schulz *et al.* 1997). For example, findings from the 1991-2004 BHPS for people aged 19 to SPA show that male and female carers have significantly lower hourly wages when in paid work, and are more likely to have lower education levels (Carmichael *et al.* 2010). Similarly, multivariate findings from England and Wales (age over 16), from the Office for National Statistics-Longitudinal Study (ONS-LS), shows that carers (at least 20 hours per week) are more likely to have no qualifications, and less likely to have higher level of qualifications; are more likely to be social tenants than homeowners; and are more likely to belong to Indian, Pakistani and Bangladeshi,

and Chinese and other ethnic groups, than white (Young *et al.* 2005). However, a small number of studies do not find such an effect, or even report an inverse effect for education (Potočnik & Sonnentag 2013; Rafnsson *et al.* 2017; Roth *et al.* 2013).

Also among samples of older adults, there is evidence supporting that individuals with lower socioeconomic position are more likely to provide informal care. Findings from the 1988/89 Retirement Survey, show that among people aged 55-69 in the UK, there are significant social class inequalities in the provision of spousal informal care, but not for co-residential parental care, as people with a working class background are more likely to provide care for their spouses (Glaser & Grundy 2002). These patterns are suggested to reflect the higher prevalence of ill health among those with lower socio-economic position (Glaser & Grundy 2002; Young *et al.* 2005). In the Health and Retirement Survey (HRS), among US citizens over the age of 55, informal carers are more likely to belong to an ethnic minority group, have fewer years of education and have lower family income (Choi *et al.* 2007).

Studies that consider the levels of care intensity, indicate that socioeconomic inequalities in caregiving status may differ according to the number of hours of care provided per week. Individuals with higher socioeconomic position may be more likely to provide fewer hours of informal care, while individuals with lower socioeconomic position are more likely to provide more intense care (O'Reilly *et al.* 2008; Sacco *et al.* 2018). O'Reilly and colleagues, using data from the 2001 Northern Ireland census, report that those who provide lower intensity of care (1 to 19 hours of care per week) belong to higher socioeconomic groups than non-carers, as measured by housing tenure, car ownership and deprivation quintile (O'Reilly *et al.* 2008). However, the opposite is the case for those providing at least 20 hours of care per week, who belong to lower socioeconomic groups than non-carers (O'Reilly *et al.* 2008). This may reflect the fact that wealthier individuals may be able to offload part of their caregiving duties by purchasing care services privately, while individuals with lower financial resources may have restricted access to care services, and therefore need to dedicate more hours to caregiving activities. This suggests that socioeconomic inequalities in care provision may be dictated, among other things, by the accessibility of social care provision services (Albertini & Pavolini 2015; Rostgaard & Szebehely 2012; Sundstrom *et al.* 2002).

The effect of the generosity of social care services on informal care provision may explain differing patterns of socioeconomic inequalities in informal care provision among countries with different social care regimes, as observed across European countries (Albertini & Pavolini 2015). One reason for country level differences in socioeconomic stratification of informal caregiving in Europe is the level of provision of formal care services, generally referred to as "care regimes" (Albertini & Pavolini 2015). The concept of the care regimes, which has arisen from feminist critiques of welfare state regimes, refers to a country's policies regulating the distribution and access of formal care services and the role of the state, the market, and the family in providing care (Lewis 1992; O'Connor 1993; Orloff 1993). Cross-national studies indicate that a lower coverage of subsidised formal care services and higher reliance on market based solution for LTC (e.g. cash for care programs) may lead to unequal access to formal care services to the disadvantage of those with fewer financial resources (Albertini & Pavolini 2015; Rostgaard & Szebehely 2012). Consequently, in countries where there is a lower coverage of formal care services, there may be a higher level of socioeconomic difference in the engagement of informal care (Albertini & Pavolini 2015). This is particularly important in the UK context, given that social care relies heavily on informal carers for elderly care compared to other European countries (Leitner 2003).

Fully understanding the relationship between socioeconomic position and provision of informal care is complicated by the fact that multiple factors (e.g. social care services, health inequalities, cultural norms and time available to provide informal care) all interact in creating socio-economic inequalities in care provision. Econometrics studies examining the relationship between income and caregiving suggest that different mechanisms may be implicated, as income may affect the relationship between socioeconomic position and caregiving in opposite directions. On the one hand, individuals with lower income may be more likely to provide informal care, opportunity cost of dedicating more time to unpaid care rather than employment is lower (Lain 2015; White-Means 1992; Wolf & Soldo 1994). On the other hand, income effects may push individuals with fewer financial resources (lower income and wealth) to dedicate time to paid work rather than to unpaid informal care, as they may suffer the increased costs that are often associated with caring for a sick or disabled individual, to a higher extent (Carmichael & Charles 2003b; Quince 2011). Carers may have to use their personal financial resources to

meet increased costs, such as extra heating, acquisition of specialist equipment and adaptation of the household to the person cared for (Dury 2014). While financial support is often available, carers may not be aware of it or know of how to access it (Taylor & Quesnel-Vallée 2017), instead choosing to draw on their own finances to cope with costs related to caregiving for someone who is sick or disabled (Dury 2014).

Longitudinal evidence from the BHPS demonstrates the complexity of explaining the mechanisms that underlie the relationship between income and provision of co-residential informal care, as the relationship varies according to gender, individual and household income and hours of care provided (Mentzakis *et al.* 2009). Among men, individual income is negatively related to the likelihood of providing any amount of informal care, whereas individual income does not affect the likelihood of caregiving among women. Opportunity costs may explain this gender difference, as it has been suggested that opportunity costs of informal care are lower for women due to lower earnings (Carmichael & Charles 2003a; Mentzakis *et al.* 2009). However, when household income is considered, individuals who live in higher income households are more likely to provide care (Mentzakis *et al.* 2009). This may suggest that higher household income may remove opportunity costs as a determining factor of caregiving, freeing individuals to engage in informal care, which then becomes a discretionary activity similar to volunteering. When examining the intensity of care, individual income is negatively related to number of weekly hours for women (Mentzakis *et al.* 2009). This effect may be due to poorer individuals not being able to buy support with care tasks on the market, and having to increase the intensity of care provided (Albertini & Pavolini 2015; Rostgaard & Szebehely 2012).

While the relationship between socio-economic position and caregiving is complex as numerous mechanisms are implicated, it seems that overall, individuals with fewer financial resources may be more likely to provide more intensive care, possibly because they cannot afford to buy help with caregiving tasks. Therefore, this means that those with lower socio-economic position may have fewer options available in regard to their choice to provide informal care. This dimension of social inequality may be additionally exacerbated by rising socioeconomic inequalities in health, that have increased in Europe (Dalstra *et al.* 2005; Kunst *et al.* 2005), which

in turn may differentially affect the need of long-term care across socioeconomic groups.

3.3.3 Carers' health and wellbeing

Cross-sectional analyses generally show that informal caregiving is associated with worse health outcomes (Choi *et al.* 2013; Gibson *et al.* 2015; Hirst 2003; Hyde & Janevic 2003; Pinquart & Sörensen 2003; Song *et al.* 2018; Vlachantoni *et al.* 2013; Young *et al.* 2005). However, it is not entirely clear what the causal flow of this relationship is, i.e. whether people with poorer health are more likely to become carers, or whether providing care leads to worse health (Vlachantoni *et al.* 2013). Analyses from the first wave of the ELSA indicate that individuals over the age of 50 who provide spousal care are more likely to report worse self-rated health (Hyde & Janevic 2003). Findings from the 2005 wave of the French cohort study, GAZEL (GAZ and ELectricité), show that among individuals aged 52 to 66, providing informal care is associated with depressive symptoms (Wahrendorf *et al.* 2006). Similarly to most of the literature on the relationship between engagement in informal care and health, the objective of the authors of the study is to identify the effect of caregiving on depression, rather than the other way round. However, as explicitly stated by the authors, it is not possible to exclude reverse causality in these studies:

> "given the cross- sectional study design we cannot draw any conclusion concerning the causal direction of the observed association. It is possible, though unlikely, that people with depressive symptoms engage more often in caring activities and less often in voluntary work." (Wahrendorf 2015)

Despite longitudinal studies being mostly concerned in examining the effect of caregiving on health, rather than the opposite relationship, the literature provides an insight also into health as a determinant of caregiving, as selection effects have been explicitly examined. Some longitudinal studies show that providing informal care has a detrimental effect on health outcomes, such as depression symptoms (Potočnik & Sonnentag 2013), quality of life (Potočnik & Sonnentag 2013; Rafnsson *et al.* 2017), sleep disturbances (Sacco *et al.* 2018; von Känel *et al.* 2012, 2014), cardiovascular and coronary heart disease (Buyck *et al.* 2013; Mortensen *et al.* 2017b), allostatic load (Dich *et al.* 2015), and self-reported health (Vlachantoni *et al.* 2016). However, other studies show that carers may actually have a health advantage when considering mortality and physical functioning (Fredman *et al.* 2010, 2015, O'Reilly *et al.* 2008, 2015). These mixed findings may be due to selection effects as the health of carers may be different from that of non-carers to begin with.

Some researchers suggest that findings support a healthy carer hypothesis (HCH) model, similarly to the healthy worker hypothesis in occupational epidemiology (Fredman *et al.* 2010). This perspective emphasises the opposite relationship, i.e. the effect of health on the likelihood of caregiving. In particular, the HCH proposes that those who are healthier are more likely to start and continue providing informal care; that continued participation in informal care leads to maintaining better health; and that declining health leads to cessation of caregiving (Fredman *et al.* 2015). Therefore, according to this model, carers have better health than non-carers, with health deterioration being the reason why carers cease the activity. While some studies from the US provide support for the HCH, using analytical techniques such as, propensity score matching to control for selection effects (Bertrand *et al.* 2012; Fredman *et al.* 2010, 2015; Roth *et al.* 2015), support for the HCH model remains limited. Indeed, the relationship between health and caregiving is likely to depend on the particular health variable considered and the national context of the research.

A small number of longitudinal British studies examined the opposite relationship, finding evidence suggesting that carers may have worse health to begin with, contradicting the HCH. Bivariate analyses of the 1991-2004 BHPS, suggest that compared to individuals who do not provide care in this period, both current and future carers are more likely to report a physical health problem at baseline (Carmichael *et al.* 2010). Further multivariate analyses in the 1991-2004 BHPS using a two-part model to control for selection, suggest that worse General Health Questionnaire (GHQ) score leads to an increased likelihood of co-residential caregiving (Mentzakis *et al.* 2009). The authors suggest that a "vicious cycle", whereby worse health leads to caregiving, which in turn leads to worse health, may explain these findings (Mentzakis *et al.* 2009). Using the 1991 and 2001 ONS-LS data, Young and Grundy show that reporting a limiting long-term illness in 1991 and/or 2001 among people aged 40-59, is associated with providing at least 20 hours per week of care in 2001 (Young & Grundy 2008).

Despite contradictory findings in the literature on the relationship between health and caregiving still need to be better understood, overall previous evidence suggests that providing informal care is associated with worse health in the UK. However, the direction of the causal relationship is still not clear. Furthermore, different health outcomes may be related differently, as outcomes related to

wellbeing, mental health and sleep disturbances seem to be negatively associated with caregiving. At the same time, British studies show that worse general health outcomes may lead to providing informal care (Carmichael *et al.* 2010; Mentzakis *et al.* 2009; Young & Grundy 2008). Thus, analyses in the empirical chapters, will consider how health inequalities affect engagement in caregiving (chapter six), and control for health characteristics for the relationship between paid work and informal care provision (chapter seven).

3.4 Who volunteers? Demographic, socioeconomic and health characteristics

3.4.1 Demographic characteristics of volunteers

While gender differences in caregiving are stark and consistent among different samples, the opposite is the case for volunteering, as studies yield contrasting findings according to national contexts. Some studies report that in North America, women are more likely to volunteer than men (Chambré 1984; Hall 2012; Hodgkinson & Weitzman 1996; Nesbit 2012), though other studies do not report any significant gender differences (Herzog et al. 1989; Fischer et al. 1991). Other studies also suggest that gender differences in volunteering are not consistent across European countries (Anheier & Salamon 2001; Gaskin & Smith 1995). While within each European country there are gender differences in volunteering, these are not as conspicuous as differences in volunteering between individual countries (Anheier & Salamon 2001; Gaskin & Smith 1995).

More recent evidence from European surveys, has confirmed the mixed picture regarding gender differences in volunteering, although findings from UK based studies seem to suggest that women are more likely to engage in volunteer work than men (ONS 2017). Findings from SHARE (ten European countries excluding the UK) and the French study GAZEL show that men are more likely to volunteer (Wahrendorf *et al.* 2006, 2008). Evidence from ELSA and the Community Life Survey conducted in 2000 and 2015 show that women are more likely to volunteer (McMunn *et al.* 2009; ONS 2017), though a different study using ELSA showed no gender differences (Zaninotto *et al.* 2013). Some authors suggest that gender differences are smaller than expected, because two separate mechanisms drive this relationship in opposite directions: while women are more likely to volunteer as they generally score higher on traits, motivations and values associated with volunteering, men have higher social capital and more resources that also raise

the likelihood of engaging in volunteer work (Einolf 2011). Furthermore, gender may have a moderating effect with other demographic variables, such as marital status (Marshall & Taniguchi 2011; Nesbit 2012; Taniguchi 2006). For example, Nesbit et al (2012) reported that divorce impacts men and women's volunteering differently in the US: unlike women, men were found to have a higher likelihood of volunteering after divorce.

The importance of marital status for volunteering seems to be attested by the fact that within couples, one's volunteering behaviour is closely linked with that of one's spouse (Rotolo & Wilson 2006; Stoker & Jennings 1995). Two different mechanisms may be driving the effect of marital status on volunteering in opposite directions. On the one hand, marriage may diminish the time available for volunteering, as more free time is invested in the relationship with the spouse at the cost of other social ties (Sarkisian & Gerstel 2008), especially for those whose motivation to volunteer was to meet new people (Lancee & Radl 2012). On the other hand, a spouse can lead to having more social connections and relationships that carry new information and opportunities for volunteering (Tang 2006).

However, evidence regarding marital status and volunteering is mixed and varies according to lifecourse stage (Hank & Erlinghagen 2009a; Wilson 2000, 2012). Though various authors report that those who are married are more likely to volunteer (Chambré 1984; Dury 2014; Freeman 1996; Nesbit 2012; Rotolo & Wilson 2006; Taniguchi 2006; Wilson 2000), other studies seem to find no significant difference according to marital status (Choi 2003; Erlinghagen 2010; Hank & Stuck 2008; Herzog & Morgan 1993). Contradictory findings may be due to the effect of marital status varying according to lifecourse stage. For example, entry into marriage, which generally occurs at younger ages, may have a short-term effect of decreasing the likelihood of volunteering, although later in life being married may be more conducive to volunteering (Stoker & Jennings 1995; Sundeen 1990; Sundeen *et al.* 2007). Other transitions that may occur in later life, such as widowhood and divorce have also been reported to have an effect on volunteering in the US and Germany, though more evidence is needed (Butrica *et al.* 2009; Lancee & Radl 2014; Nesbit 2012). For example, findings from the German Socio-Economic Panel Survey (SOEP) show that divorce leads to a decreased probability of volunteering.

Cohort variations in volunteering have attracted attention, due to concerns regarding possible declines in the participation in civic engagement, volunteering and overall social capital among younger generations in western countries (McCulloch 2014; Putnam 1995a). A seminal article by Putnam, who examined this trend in the US, ascribed the decline in social capital to changes in cultural values among members of different cohorts, such as the decline in "civic mindedness" and the erosion of social trust (Putnam 1995a, 1995b). Using BHPS data, McCulloch suggested that similar cohort differences in volunteering behaviour in Great Britain are due to economic and social policy changes (McCulloch 2014). Considering the potential cohort effects over and above age effects, analyses in the upcoming chapters account for cohort membership as a potential confounder of the relationship between participation in paid work and engagement in volunteering and informal care provision.

Overall, previous studies show that for both informal care and volunteering there are significant variations by demographic characteristics such as age, cohort membership, gender and marital status. It is important to account for the effect of these covariates as they can be considered potential confounders for the relationship with paid work. Since marital status transitions (union formation and disruption) affect engagement in volunteering in different ways, marital status is treated as a time varying variable, rather than accounting for it at a single point in time, in the longitudinal analyses that use repeated measurements in chapters seven and eight.

3.4.2 Socioeconomic characteristics and volunteering

While limited research has examined how socioeconomic variables affect informal care provision, a conspicuous number of studies has examined how human capital affects volunteering behaviour, through variables such as education, income and social class. Education, as a measure of human capital, has been consistently showed to be positively linked with volunteering in different countries and it is considered one of the main assets for volunteering (Dury *et al.* 2014; Lancee & Radl 2014; McCulloch 2014; Tang 2006; van den Bogaard *et al.* 2014b, 2014a, Wilson & Musick 1997, 1998). There are various mechanisms through which education may affect volunteering. Individuals with better education are more likely to come into contact with volunteering opportunities as they are more often part of professional and social networks where they are asked to become volunteers (Herzog & Morgan

1993). Young adults with higher education are more likely to seek out volunteering opportunities as a means to access new skills and connections to advance their careers in the paid labour market (Tang 2008). While this mechanism may not be relevant for older adults, its effect may last into later life, as prior engagement in volunteering earlier in the lifecourse is an important determinant of volunteering in later life (Lancee & Radl 2014).

Household income, commonly used in the sociological literature on volunteering as another proxy indicator of human capital, is generally found to be positively related to engagement in volunteering among older adults (Dury et al. 2014; Fischer et al. 1991; Freeman 1996; Gallagher 1994; Tang 2006). This is in contrast with the traditional microeconomic assumption of rising opportunity costs, which would predict that individuals with higher income would have less incentive (i.e. higher opportunity cost) to invest time in volunteer work (Freeman 1996; Wilson & Musick 1997). Examining the nuances of the relationship between income and volunteering, previous evidence suggests that this relationship may not be linear, as income and the amount of time spent on volunteer work may not be positively associated t (Gallagher 1994; Lee & Brudney 2009; Tang 2008). Findings from the Belgian Aging Studies show that volunteers and potential volunteers (non-volunteers interested in commencing volunteering in the near future) have higher income than non-volunteers; however, there is no significant income difference between actual and potential volunteers (Dury *et al.* 2014).

Socioeconomic characteristics, such as education, income and tenure, are important determinants of engagement in volunteering. Therefore, multivariate models that estimate the effect of paid work on engagement in volunteering, control for socioeconomic characteristics. Previous evidence also shows the relevance of volunteering for socioeconomic inequalities in health. Socioeconomic inequalities in volunteering may exacerbate inequalities in health, as only those who are advantaged may be able to reap the health benefits of volunteering (Gonzales *et al.* 2015). While promoting engagement in volunteering may be a strategy to improve population health at older ages, as part of the active ageing framework (WHO 2002), the evidence reviewed here, suggests that individuals from lower socioeconomic groups (e.g. lower education and income) may have lower engagement in volunteer work. Few studies have considered the relevance of social disadvantage for inequalities in engagement in paid and unpaid activities at later ages, despite their

clear relevance to concepts such as productive and active ageing (Gonzales *et al.* 2015). In order to further the understanding of how socioeconomic characteristics shape inequalities in engagement in paid and unpaid work in later life, chapter six shows how pathways of engagement in multiple activities are related to socioeconomic characteristics.

3.4.3 Volunteering and health

Several studies have examined the relationship between health and volunteering, showing that volunteering is strongly associated with better health, according to several health related outcomes (Carr *et al.* 2017; Choi *et al.* 2013; Glass *et al.* 1999; Griep *et al.* 2015, 2017; Jenkinson *et al.* 2013; Li & Ferraro 2005, 2006; McMunn *et al.* 2009; Nazroo & Matthews 2012; Sugihara *et al.* 2008). Similar to research on informal caregiving and health (section 3.3.2), most studies have been concerned in identifying the effect of volunteering on health, rather than the other way round. In particular, previous research in this area has focused on understanding how engagement in volunteering can be harnessed to improve population health in the context of population ageing. Concepts such as productive ageing and the active ageing framework, emphasise how engagement in these unremunerated activities among older adults is not only a way to increase productivity in the economy among retirees, but also a means to improve health in later life (Baltes & Baltes 1990; Butler & Gleason 1985; Foster & Walker 2015; Rowe & Kahn 1997; WHO 2002). As discussed in section 2.4.2, empirical findings support this perspective, as volunteering seems to lead to improved health outcomes.

However, some studies have also examined health selection into volunteering, to understand whether ill health may act as a barrier to volunteering. An issue with observational epidemiological research evaluating the health effects of engagement, are reverse causality and selection effects mechanism, which hamper causal inference. It may be that individuals who volunteer differ from non-volunteers according to unobserved factors that cause selection effects. For example, people who volunteer may have better health than non-volunteers to begin with; or other factors such as higher education, that are also predictors of better health, may select individuals into volunteering (Blane *et al.* 1993; Li & Ferraro 2005).

Indeed, in the sociological literature on volunteering, general health is reported to be an important resource, along with other components of human

capital, that enables individuals to partake in volunteer work (Dury *et al.* 2014, 2015; Flood & Moen 2015; Komp *et al.* 2011; Wilson 2000; Wilson & Musick 1997). In regards to engagement in volunteer work, Wilson and Musick note that "good health is a resource; bad health is a constraint" (Wilson & Musick 1997, pp.699). Hank and Erlinghagen, examine the predictors of transition in and out of volunteering over two waves of the SHARE study, reporting that those who had poorer self-rated health at both waves were less likely to take-up and more likely to discontinue volunteering, and those who reported declining health were less likely to take-up volunteering (Hank & Erlinghagen 2009a). Similar results have been reported from the 1996-2004 HRS, as according to self-reported measures, ADLs and IADLs, and depressive symptom, being in better health was associated with taking-up volunteering, while worse health was associated with breaks from volunteering (Butrica *et al.* 2009). These findings support the view that health is a barrier to volunteering, as those in worse health are less likely to volunteer.

Some studies explicitly compared social selection and causation, in order to disentangle the beneficial effect of volunteering on health, from the volunteers' prior health. Findings suggest that both mechanisms may be contributing to volunteers on average being in better health. Longitudinal findings from the Americans' Changing Lives (ACL) study show that health and wellbeing predicted engagement in volunteering at follow-up, and vice versa (Thoits & Hewitt 2001). Li and Ferraro (2006) tested the causation mechanisms against two distinct selection processes of health on volunteering: health as a barrier would predict that ill health stops individuals from volunteering; selection through compensation instead refers to individuals seeking to volunteer or continue volunteering despite declining health. The compensation mechanism is borne out of the selective optimisation hypothesis as defined by the socioemotional selectivity theory (Carstensen 1992). In their previous study they show that the onset of depression may be a trigger to start volunteering in later life (Li & Ferraro 2005). Using structural equation models, findings from the ACL provide partial support for causation and compensation in the whole sample (age over 40), and support for health as a barrier for middle-aged individuals (40-59) (Li & Ferraro 2006).

Previous evidence strongly suggests that volunteering is linked with better health, through both causation and selection mechanisms. In other words, healthier people volunteer, and volunteers become healthier. Therefore, it is pivotal to

consider engagement in volunteering in later life in relation to health inequalities and cumulative disadvantage. Active ageing related initiatives need to be inclusive of the oldest-old, as they are more likely to suffer from ill-health, and those who suffer from chronic illnesses (Komp *et al.* 2011). Considering the reviewed evidence, chapter six considers how health affects inequalities in engagement in paid and unpaid activities from mid to later life, while chapter eight controls estimates for health measures.

3.5 The relationship between paid work and engagement in informal care and volunteer work

Existing evidence on the relationship between paid work and informal care provision, and paid work and volunteering is reviewed in this section. The aim is to provide a detailed review of the current knowledge on the effect of paid work on engagement in these unpaid activities in later life, outlining the existing research gaps and limitations in previous studies. The evidence reviewed in this section has been used to inform the research questions outlined in chapter four.

3.5.1 The influence of paid work on informal care provision

Previous research examined the competition between paid work and caring roles, emphasising the negative consequences of caring for the ability to participate in the labour market, as well as on financial outcomes (Berecki-Gisolf *et al.* 2008; Brown *et al.* 2014; Carmichael & Charles 2003b; Carr *et al.* 2018; Ciani 2012; Evandrou & Glaser 2003; Heitmueller 2007; Heitmueller & Inglis 2007; King & Pickard 2013; Leigh 2010; Michaud *et al.* 2010; Nguyen & Connelly 2014; Principi *et al.* 2014). Studies using British data have consistently reported that informal care and employment are inversely related, with some studies reporting that providing care for 20 hours or more hours per week impacts negatively on employment (Carmichael *et al.* 2010; Heitmueller 2007; Robards *et al.* 2015; Young & Grundy 2008), while others suggesting that 10 hours per week as a threshold for this effect (Arber & Ginn 1995; King & Pickard 2013; Carmichael & Charles 2003; Fiona Carmichael & Charles 2003; Carmichael et al. 2008). Research using four waves from ELSA suggests that men and women who provide care, aged 50 to SPA, are less likely to be in employment at follow-up (approximately two years later) (King & Pickard 2013). Similarly, findings from the 2009-2014 UKHLS show that among older workers (ages 50 to 75), those who provide informal care within the household or to a spouse, are more likely to exit from full-time employment (Carr *et al.* 2018). In

addition, women working full-time and part-time are more likely to leave employment when starting to provide at least 10 hours of care per week (Carr *et al.* 2018).

However, the causal flow of this association is most likely bi-directional, as longitudinal studies using instrumental variable approaches reported that endogeneity plays an important role in this association. For example, findings from the 2001-2007 Household, Income and Labour Dynamics in Australia (HILDA), focusing on the 25 to 65 age group, show that carers are more likely to have a lower employment rate, work fewer weeks per year and hours per week, and receive a lower wage (Leigh 2010). However, this effect was substantially reduced after controlling for individual fixed effects, indicating that there is only a weak causal effect of care provision on employment (Leigh 2010). This suggests that carers may have a weaker attachment to employment to begin with, partially explaining the negative association with paid work. Similar findings, suggest that endogeneity plays a strong role in the relationship between informal care provision and participation in paid work. Heitmueller (2007), using an instrumental variable approach on data from 1991 to 2003 waves of the BHPS, found that after accounting for potential reciprocal effects, the detrimental effect of caring on employment was significant, only for co-residential carers or when providing more than 20 hours of care per week.

In the economics literature, several mechanisms have been used to explain the bidirectional relationship between paid work and informal caregiving: the substitution, income, respite and discrimination effects. These include the substitution effect, whereby individuals provide care instead of paid work due to time constraints (Carmichael & Charles 2003). The income effect refers to carers having to increase their participation in paid work, due to the increased financial costs encountered while caring (Carmichael & Charles 2003b). For instance, some carers have to face increased household costs linked to the increased needs of the people they are caring for, e.g. specialist equipment for assisting sick and disabled people (Dury 2014). Despite financial assistance from welfare states being available, carers may not be aware of the availability of these resources and use their private savings instead (Dury 2014; Taylor & Quesnel-Vallée 2017). Income, and more generally wealth, may also affect this relationship, as individuals with better financial resources may have the possibility of purchasing care services (Young &

Grundy 2008). According to the respite effect, carers may wish to increase the time they spend in paid work, in order to have a break from the emotional demands of caring duties (Carmichael & Charles 2003b). The discrimination effect describes the possibility that carers may decrease their labour market participation, due to being paid systematically less than non-carers, as a result of discrimination in the workplace (Heitmueller & Inglis 2007). For instance, findings from the BHPS suggest that, aside from the opportunity cost of reduced labour participation, carers are paid less even when they are employed (Heitmueller & Inglis 2007).

Research Gaps

An important research gap in the literature is that few studies have investigated the effects of paid work on the likelihood of providing informal care, as most work to date has focused on the opposite relationship. Previous research from the US investigating the effect of employment on women's uptake of informal care yielded mixed results (Boaz & Muller 1992; Moen *et al.* 1994; Pavalko & Artis 1997; Robison *et al.* 1995). However, some of these studies have used small samples (Moen *et al.* 1994; Robison *et al.* 1995). Findings from the 1994-1995 British Family and Working Lives Survey, on a sample of people aged 20 to the age of retirement, suggested that employment does not affect men's and women's likelihood of undertaking informal care (Henz 2006). However, it should be noted that a majority of the sample was younger than 50 years of age. Conversely, findings from the Office for National Statistics Longitudinal Study (ONS-LS) showed that among a representative sample of the English and Welsh population aged 16 to 74, carers in 2001 who reported that they were looking after their homes as their main economic activity, were more likely to provide care in 2011, compared to carers who were employed full or part time, self-employed, looking for work, retired, studying or sick (Robards *et al.* 2015). The same study showed that those providing intensive care (i.e. more than 20 hours of care per week) and who were also looking after their homes, were more likely to provide intensive care ten years later than carers who were employed (full/part-time), self-employed or retired (Robards *et al.* 2015). It is difficult to extrapolate what these findings imply for the effect of paid work on the likelihood of caring for others in the years leading up to and beyond retirement, as these studies have used samples that included, or focused on, younger people.

Another limitation of previous literature is that few studies have adopted a lifecourse perspective to understand how family and employment experiences

affect the likelihood of providing informal care later in life. The fact that previous research showed that selection effects explained a large portion of the negative relationship between caring and paid work (Berecki-Gisolf *et al.* 2008; Heitmueller 2007; Leigh 2010; Mentzakis *et al.* 2009; Michaud *et al.* 2010) underscores the importance of considering the effect of earlier employment and family lifecourses to understand older adults' likelihood of providing care. For example, evidence from the ONS-LS focusing on people aged 40-59 in 2001 showed the importance of employment experiences earlier in the lifecourse for subsequent care provision (Young & Grundy 2008). Men and women with weaker labour market attachment in 1981 and 1991 were more likely to be providing informal care in 2001. Furthermore, it was found that women who were working full-time in 1991, after childbearing between 1981 and 1991, were 50% less likely to provide care in 2001 compared to their counterparts who did not return to the labour market after childbearing (Young & Grundy 2008). However, it should be noted that this study used employment reported at two single points in time (1981 and 1991) as a proxy for labour market attachment and that data was only collected at 10 year intervals (Young & Grundy 2008). Further research is needed to understand how paid work influences the likelihood of caregiving in mid to later ages. This information is needed to gain further insights into how increasing participation in the workforce in the years leading up to SPA, and how increases in the SPA, may affect the supply of informal care by individuals in later life.

3.5.2 The influence of paid work on volunteering

While informal care provision and volunteering are both unpaid forms of work, they are fundamentally different activities. Informal care provision, is an activity that is performed in the private domestic sphere, where obligations are likely to be critical to individuals' decisions to take up this activity (Pearlin 1994). By contrast, volunteering is unpaid work performed in the public sphere that is exempt from any obligation towards relatives and friends (Wilson & Musick 1997). The fact that informal caring and volunteering may have opposite effects on the health of individuals taking part in these activities - caring may have a detrimental effect, while volunteering a beneficial one (Potočnik & Sonnentag 2013; Wahrendorf *et al.* 2008) - further indicates that the decisional context between caring and volunteering activities may differ substantially.

Significantly less research, mostly using data from the US, has looked into the interrelationship between volunteering and paid work, compared to research on the co-occurrence of caregiving and paid work (Nazroo 2015). Whilst substantial research shows that caregiving and paid work are in competition for individuals' time, previous research on volunteers of all ages (i.e. research not focusing specifically on older or retired individuals) largely from the US, suggests that volunteering and paid work are complementary activities (Stubbings & Humble 1984; Wilson & Musick 1997, 1998, 2003, 1999). This difference between caregiving and volunteering is due to the different nature of the two activities. On the one hand, caregiving is a non-discretionary activity, as one's decision to provide informal care is dependent on obligations and unpredictable circumstances, i.e. ill-health or disability of a family member or friend, which may be outside the carer's control (Pearlin 1994). On the other hand, volunteers have more control over their decision to engage in volunteering and civic activities, as people are generally free to decide when and to what extent, they take up unpaid volunteer work (Wilson 2000).

Most of the studies on the interrelationship between paid work and volunteering amongst older adults, are cross-sectional and report mixed findings, with some studies reporting no association at all (Caro & Bass 1997; Carr & Kail 2012; Chambré 1984; Choi 2003; Herzog & Morgan 1993), or a higher probability of engaging in volunteering among older adults outside of the labour market (Dosman *et al.* 2006; Hank & Erlinghagen 2009b; Kobayashi *et al.* 2018; Mutchler *et al.* 2003; van den Bogaard *et al.* 2014b). Furthermore, previous evidence focusing on older adults has consistently reported that among volunteers, those who are in employment are likely to spend less time doing volunteer work. For instance, Chambré (1984) reported a positive association between volunteering and paid work after adjusting for age, gender, education and household income, in a sample representative of the US population. However, after adjusting for potential confounders, volunteers who were not in paid work, volunteered significantly more hours (Chambré 1984). Similarly, findings from a US sample of people over the age of 55 suggest that retirement is not associated with higher rates of volunteering, but volunteers who were not participating in the labour market were, on average, volunteering for more hours (Caro & Bass 1997). This study also reported that non-volunteers who had recently left employment (less than two years), were more likely to report that they were willing to volunteer, compared to people who were

in employment or had left employment for more than two years (Caro & Bass 1997). A report published by the Harvard School of Public Health and MetLife reported that a reduction in paid work hours was associated with an increase in hours of volunteering (Gerteis *et al.* 2004).

The negative relationship between time spent in paid work and time spent in volunteering is further supported by studies that found that older adults who worked part-time were more likely to volunteer than individuals who worked full-time. For example, findings from the Canadian 1998 General Social Survey indicated that older women who worked part-time or had retired from paid work were more likely to report volunteering in the previous 12 months compared to full-time workers (Dosman *et al.* 2006). In addition, this study also found that among male volunteers, retirees were more likely to spend more time volunteering, compared to full-time workers (Dosman *et al.* 2006). Analyses from the Asset and Health Dynamics Among the Oldest Old (AHEAD) study, which is representative of the US population born before 1924, reported weak evidence (p-value<0.1) that older adults who worked part-time are more likely to volunteer in the past 12 months, and commit more hours to volunteer work compared to individuals who were not working (Choi 2003). This effect was not observed for full-time workers. Carr and Kail (2013) examined the inverse relationship, suggesting that part-time work and volunteering are complementary activities. Using HRS data, they investigated whether volunteering transitions (starting, stopping or continuing volunteering) affect transitions into full-retirement or partial retirement (i.e. working fewer hours), showing that continuous volunteers are more likely to transition into part-time work (Carr & Kail 2012).

Previous evidence seems to suggest that while full-time work may not be compatible with engagement in volunteer work, working on a part-time basis or for fewer hours is instead associated with dedicating more time to volunteer work, among volunteers. This may imply that time constraints between different forms of employment and volunteering are relevant for those who are active in the labour market. Little is known about whether control over working hours may play a role in explaining the inverse relationship between time spent in paid work and time spent volunteering. Previous evidence suggests that people who have more flexible working arrangements, such as those who are self-employed, may combine volunteering and paid work more effectively (Freeman 1996; Mergenthaler *et al.*

2018; Thompson 1993a, 1993b). Findings using the 1989 Current Population Survey (CPS), based on a sample of the US population aged 16-64, show that men and women who report having employment arrangements that allow for "flexitime or some other work schedule that allows workers to vary the time they begin and end their workday", are markedly more likely to engage in volunteering. Thompson (1993a), reporting that self-employed individuals are more likely to volunteer, argues that self-employment may allow individuals to retain more control on their work schedules, and consequently also to participate in volunteer work. Another explanation for a positive association between self-employment and volunteering is that self-employed individuals are more integrated in their communities (Thompson 1993a). However, previous research on this topic has mainly used relatively small occupational samples, whose findings are not generalizable to older adults (Thompson 1993b, 1993a).

Taking a longitudinal perspective, some evidence indicates that participation in paid work has a negative effect on engagement in volunteering among older adults (Butrica *et al.* 2009; Carr & Kail 2012; Di Gessa & Grundy 2016; Hank & Erlinghagen 2009a; Mutchler *et al.* 2003). For instance, findings from the first two waves of SHARE show that people over 50 who report being retired or unemployed across the two waves, and people who report retiring or becoming unemployed at the second wave are more likely to take up volunteering at the second wave (Hank & Erlinghagen 2009a). Furthermore, those who are employed in the second wave, after reporting being retired or unemployed at the first wave, are more likely to stop volunteering at the second wave (Hank & Erlinghagen 2009a). Further analyses using SHARE and ELSA data showed that individuals who stopped working between two waves were more likely to partake in formal engagement in Denmark and France – results were not significant for England and Italy (Di Gessa & Grundy 2016). Formal engagement was defined by the authors as engagement in "social activities linked to formalized associations or groups", which includes volunteering as well as other activities such as participation political and religious organizations and further training and education (Di Gessa & Grundy 2016).

Research Gaps

Further research is needed to understand how paid work affects engagement in volunteering in middle to later life, as several research gaps remain. Most of the previous evidence on the relationship between paid work and volunteering relies

on cross-sectional data that is affected by reverse causality and selection effects, thus not allowing any causal inference to be drawn. Longitudinal studies are also unable to fully ascertain causality, due to issues that commonly affect observational studies such as selection effects (Hernán *et al.* 2004). Nevertheless, longitudinal analyses allow better understanding of the association and causal inference to a limited extent. Using longitudinal data, it is possible to study the association in the temporal order of interest (i.e. the effect of prior paid work on subsequent engagement in volunteering), which is one of the criteria set by the epidemiologist Bradford-Hill to establish causality (Hill 1965). In addition, certain panel data techniques can be used to control for selection effects. For instance, fixed effects models, which utilise only within individual variability i.e. changes within individuals over time, allow for more sensible causal inferences, as virtually each individual becomes their own control (Wooldridge 2010). In chapters seven and eight, WB-RE models, which produce estimates that are analogous to those of fixed effects models are utilised (Bell & Jones 2015b; Schunck & Perales 2017). This approach provides novel evidence, as previous longitudinal studies that have evaluated the relationship between paid work and volunteering have mostly relied on short panels and have not used methodological approaches that deal with selection effects.

Further research is needed to determine how paid work affects engagement in volunteering, as well as the frequency of volunteer work. Most previous studies do not differentiate between different frequencies or intensities of engagement in volunteering. This is important as frequency of participation in volunteering can differ substantially with meaningful differences, as different levels of participation may imply different levels of social contact and responsibilities on the part of the volunteer (Herzog *et al.* 1989; Mutchler *et al.* 2003). It is indeed possible to distinguish occasional from regular volunteering, or monthly from weekly levels. In chapter seven, the focus is placed on volunteering on a regular basis, rather than occasional, and distinction will be made between monthly and weekly volunteering.

Another gap in the current knowledge is whether different types of employment (e.g. part-time work, self-employment) affect engagement in volunteering differentially. While full-time paid work may negatively affect engagement in volunteering, as reviewed above, some evidence suggests that part-time and self-employment may have the opposite effect on volunteering. Some

authors suggest that self-employment may allow individuals more flexibility in the workplace in terms of work schedules (Thompson 1993a, 1993b). However, previous studies that evaluated self-employment were cross-sectional, and used occupational samples from specific professions or voluntary organisations, thus the results are hardly generalisable to individuals in mid to later life in the UK. In the following chapters, the type of employment will be considered in the analyses.

3.5.3 Engagement in multiple activities: latent engagement profiles

As detailed above, a growing body of literature has been examining the interrelationships between paid work, volunteering and informal care provision. However, most studies have investigated relationships between two activities at a time (e.g. paid work and caring, or paid work and volunteering). The reason there are contradictory findings on the relationship between unpaid activities may be due to the fact that studies focusing only on pairs of activities fail to grasp the complex picture of older adults' engagement in multiple activities. While previous research suggests that certain activities may compete for individuals' time, they do not provide a clear picture of people's commitments to family roles, employment, volunteering and civic engagement. Moreover, engagement in paid and unpaid activities may be patterned differently according to sociodemographic circumstances, health status and previous lifecourse experiences. To date, only a handful of studies have investigated patterns of multiple activities, including leisure and self-care activities, using cluster analysis statistical methods, such as latent class analysis (LCA), to try and capture the nuances of engagement in multiple paid and unpaid activities in mid to later life (Burr *et al.* 2007; Fernandez-Ballesteros *et al.* 2011; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014; van der Horst *et al.* 2016). Most of these studies included several "productive" unremunerated activities in their analyses (informal caring and volunteering being the ones that are always included) following a definition of productive activity inspired by the concept of productive ageing (Butler & Gleason 1985), i.e. any marketable activity that produces goods or service regardless of whether they are remunerated (Bass & Caro 2001; Hawrylshyn 1977).

One of the common findings among these studies is that they generally identify a large cluster of individuals with very low levels of engagement in all paid and unpaid activities, and at least one smaller cluster with substantially higher levels of engagement in a mix of activities. For example, LCA in the ACL study

identifies four clusters among people aged over 55: 1) helpers (46% of the sample), have a low likelihood of participating in paid work and caregiving, and a moderate one of volunteering, informal help and home maintenance; 2) home-maintainers (35%), have a low to moderate probability of low levels of involvement in home maintenance and a very low probability of engagement in any of the other activities; 3) workers/volunteers (15%), have a higher probability of engaging in paid work compared to other groups, and moderate to high likelihood of volunteering, informal helping and home maintenance; and 4) the super-helpers (4%), had a high likelihood of high levels of engagement in all unpaid activities, and a low likelihood of participation in paid work (Burr *et al.* 2007). The second cluster, "home maintainers", is characterised by very low engagement in both paid and unpaid activities compared to the other clusters; in particular the much smaller third and fourth clusters (workers/volunteers and super-helpers), look diametrically opposite, as they are characterised by engagement in a wide variety of activities. Other studies that examined the latent structure of engagement among individuals in mid to later age report similar clusters (Fernandez-Ballesteros *et al.* 2011; Mergenthaler *et al.* 2018; Morrow-Howell 2010).

Findings from the HRS suggest that individual characteristics, such as gender, education, wealth, income and health may play a role in driving differences in engagement among individuals over 55 in the US. Morrow-Howell and colleagues identify five activity profiles, using factor and LCA with 36 items from the HRS: workers, physically active, high activity, moderate activity, and low activity (Morrow-Howell *et al.* 2014). Using multivariate analysis, the authors show that while the high activity profile group resembles the ideal of an "active retirement" achieving better health and wellbeing outcomes, the low activity profile applies to a subgroup characterised by social disadvantage – i.e. lower wealth and education, fewer social contacts, and poorer health and wellbeing (Morrow-Howell *et al.* 2014). These findings emphasise the relevance of social disadvantage for engagement in paid and unpaid activities, as inequalities in engagement in mid to later life may in turn exacerbate socioeconomic inequalities in health. However, these findings have been only partially replicated in a sample of German individuals aged 60 to 70 (Mergenthaler *et al.* 2018). The authors examined engagement in paid work, volunteering, informal helping, child care, and caregiving and identified four latent subgroups: multiple engagers (very high likelihood of paid work, moderate/high of

volunteering and caring); volunteers (low likelihood of paid work, very high of volunteering, moderate of caring); family helpers (low likelihood of paid work, moderate/high of volunteering, very high of caring); and family disengagers (low of paid work and caring and low/moderate of volunteering). They report that volunteers and family helpers clusters have different individual characteristics to the family disengagers cluster, such as higher education, lower likelihood of poverty for the family helpers, and better subjective health for the volunteers (Mergenthaler *et al.* 2018). Further research is required to understand the effect of different socioeconomic and health characteristics related to patterns of engagement in mid to later age. In particular research from different national contexts and in different samples may provide insights into whether inequalities in engagement may differ in different welfare contexts.

Additional analyses on the clusters in the ACL data, suggest that the effect of ageing may be responsible for differences in levels of activity between clusters, as membership in each cluster is strongly associated with age (Burr *et al.* 2007). Findings show that individuals belonging to the clusters with lower engagement (home maintainers) are more likely to be older, while the relationship is inverted for those with higher engagement (workers/volunteers and the super helpers) - they are more likely to be younger (Burr *et al.* 2007). Burr et al (2007) suggest that this pattern is in line with the selective optimization with compensation theory of successful ageing (Baltes & Baltes 1990). This theory proposes that, with ageing, people reduce their level of involvement in multiple activities, choosing to engage in fewer selected activities, to adapt to reductions in biological, mental and social reserves. However, as this mechanism implies an effect of age over time, it needs to be investigated using longitudinal data, as cohort or period effects may confound this relationship (Bell & Jones 2015a).

Nevertheless, evidence on the effect of age on engagement in unpaid activities is mixed, and complicated by the fact that age affects engagement through various direct and indirect mechanisms (Bell & Jones 2013; Komp *et al.* 2011; Rutherdord *et al.* 2010). First, age differences may reflect cohort effects, whereby people of different ages have experienced historical events and social contexts at different life stages, e.g. people growing in the post-war period in the UK are more likely to have benefitted more in the creation of the welfare state and the National Health Service (NHS). Second, age effects on engagement may reflect life events such

as retirement (Nesbit 2012; van den Bogaard *et al.* 2014b). Third, declining health as people get older may be driving age effects (Leinonen *et al.* 2001). Using US, German, Greek and Danish data from HRS and SHARE, Komp and colleagues (2011) evaluated the relative importance of direct and indirect age effects on engagement in volunteering. They find that overall age is not an important predictor of volunteering and call for a more careful interpretation of age effects on engagement. Although this study provided a novel insight into age effects, the analyses were cross-sectional, therefore, unsuitable to disentangle cohort effects.

Only one notable study attempted to model multiple paid and unpaid activities using a longitudinal approach. Van der Horst and colleagues (2016), using data from ELSA, assessed the relationship between sequences of engagement in paid work, caring and volunteering, measured over a ten-year period, from ages 50 and over. The authors, first generate longitudinal sequences of the three activities, and subsequently use clustering techniques to examine relationships between the three sequences. Findings do not provide conclusive evidence regarding interrelationships as the sequence analysis for volunteering and caring did not yield categories that enable them to test whether activities are complementary or competitive. Their findings seem to suggest that volunteering and part-time work may be complementary activities and that combinations of paid work, volunteering and informal care provision is highly gendered (van der Horst *et al.* 2016). Yet, due to the study's methodological approach, which substantially reduces the sample size, it is not possible to examine socioeconomic patterns of engagement (van der Horst *et al.* 2016).

Research Gaps

Examining the interplay between multiple paid and unpaid activities underscores the fact that groups of individuals who differ according to unobserved characteristics may combine multiple roles and activities differently. For example, Burr and colleagues found that for some people volunteering and paid work are complementary activities (Burr *et al.* 2007). This approach enables one to draw a more realistic picture about the complexity of older adults' multiple roles. In addition, research investigating the latent structure of unpaid activities has the potential to shed light on socioeconomic and health inequalities in engagement in paid and unpaid activities, allowing one to determine which groups are disadvantaged in terms of engagements, i.e. which groups have very low

engagement in paid and unpaid activities or do not participate in activities that are beneficial for their health. It is important to consider inequalities in engagement as it has been suggested that promoting engagement at a later age, through the active ageing policy framework, may exclude disadvantaged socioeconomic groups (Boudiny 2013; Gonzales *et al.* 2015; Pike 2011).

While several studies have examined the interrelationships between multiple activities, showing the nuances of engagement in paid and unpaid work in mid to later life, two important research gaps remain. First, most of the studies are cross-sectional, barring any solid inference on the mechanisms that may drive the differences in the levels of engagement in different activities. Most clustering techniques such as LCA, do not allow confounders such as age to be included in the clustering analysis. Findings by some of the studies that age is related to the clusters may suggest that ageing effects are relevant in determining the level of engagement in mid to later life (Choi *et al.* 2007). However, longitudinal approaches that explicitly model age are required to evaluate this (Komp *et al.* 2011). An ingenious study provided an insight on engagement in paid work, informal care and volunteering using sequence analysis; however, the approach used did not allow the longitudinal modelling of multiple activities simultaneously (van der Horst *et al.* 2016). Second, only a few studies evaluated how demographic, socioeconomic and health characteristics relate to clusters of engagement (Mergenthaler *et al.* 2018; Morrow-Howell 2010). Further research, from different national contexts, is needed to provide evidence regarding the socioeconomic patterning of engagement in mid to later ages, as patterns of engagement may have important implications for health inequalities in later life. To date, none of these studies has investigated the relevance of engagement for cumulative advantage and disadvantage in the British context.

In chapter six, findings on engagement in multiple paid and unpaid activities are presented. Two staged LCA is used, as it enables to explicitly model age (Macmillan & Eliason 2003), exploring clusters of distinct pathways of engagement in multiple activities in mid to later life.

3.6 Conclusion

In this chapter, the previous literature on engagement in volunteering and informal care provision, and their interrelationship with paid work, has been reviewed. Previous research shows the importance of controlling for gender, marital status, socioeconomic, and health characteristics. These variables are related to both

participation in paid work and engagement in volunteering and in informal care provision in mid to later life. Furthermore, it is important to explore patterns of engagement according to socioeconomic and health characteristics, as engagement in later life is relevant to socioeconomic inequalities in health. While many studies have analysed the relationship between paid work and engagement in volunteering and informal care provision, research gaps remain. Most importantly, further longitudinal research that disentangles causal and selection effects is needed. Additionally, little research has explored the interrelations between multiple activities in mid to later life to provide a nuanced picture of individuals' engagement in the years leading up to and following retirement. The following chapter outlines relevant theoretical frameworks and the research questions, including a detailed overview of the framework that guides the research presented in chapter six, seven and eight

Chapter 4

Theoretical Framework and Research Objectives

4.1 Introduction

In this chapter, theories and perspectives that are relevant to engagement in paid and unpaid work in later life are outlined. Building on these theories, a detailed overview of the theoretical framework that guided the research approach taken in this thesis is provided. Scholars from several academic disciplines, including gerontology, sociology, economics and lifecourse research, have contributed to the theoretical work that underlies the research on older adults' engagement in paid and unpaid work. Furthermore, in keeping with the interdisciplinarity of previous research, this chapter integrates key concepts from the lifecourse perspective into role theory. Lifecourse concepts, such as trajectories and cumulative advantage/disadvantage, are considered alongside role theory, in order to conceptualise how engagement in multiple paid and unpaid activities changes through mid to later life, and how these trajectories of engagement are related to socioeconomic and health inequalities. In addition, gerontological theories as well as sociological theories of volunteering are outlined, as they provide further theoretical basis for interpreting the empirical findings.

The following section (4.2), describes gerontological theories of ageing which have expounded on the engagement of older adults, highlighting changes in social roles experienced by individuals in the years leading to and following retirement. Section 4.3 provides an overview of the perspectives that are included within role theory (role enhancement/overload and role substitution/extension), which have guided much of the research concerning the interplay between paid work, informal care provision and volunteering. Section 4.4 summarises concepts from the lifecourse perspective that are relevant for the research presented in this thesis. Section 4.5 expands on the previous section by outlining lifecourse perspectives that concern socioeconomic inequalities (cumulative advantage/disadvantage and cumulative inequality). While concepts such as cumulative advantage/disadvantage have been used extensively to examine health inequalities, only a few recent studies have noted their relevance for studies on engagement in paid and unpaid activities in mid to later life. Section 4.6 focuses on theoretical perspectives on volunteering, such as resource theory. Finally, section 4.7, building on the theoretical perspectives outlined herein and based on the previous research reviewed in chapter three, outlines the theoretical framework and the research questions that guided the research presented in this doctoral thesis.

4.2 Relevant theories in social gerontology

Although the field of social gerontology is not theory laden, many of its theories are of relevance to the main topic of this thesis: engagement in paid and unpaid activities in the years preceding and following retirement. Gerontologists have a long-standing interest in older adults' engagement in paid work and unpaid activities, especially in relation to individuals' social roles after retirement. Tracing the development of gerontological theories reveals how ideas concerning retirement and older adults' participation in remunerated and unremunerated work substantially changed from the second half of the 20th century. This section reviews relevant gerontological theories, showing how ideas concerning older adults' engagement have developed over time and how they relate to current research. These theoretical considerations provide substantial ground for interpreting the empirical findings in chapter nine.

4.2.1 From disengagement and activity theory to structured dependency

Many of the theories in the field of social gerontology are based on structural-functionalism paradigms, as they attempt to unearth the function, for both individuals and society, of social institutions relating to older adults', such as retirement. Disengagement theory and activity theory, which emerged in the 1950s and 1960s, represent two diametrically opposite views of what later life "ought" to look like. The former conceptualised later life as a period where individuals withdraw from work and family life, with the assumption that this is the preferable option for both individuals and society (Cumming & Henry 1961). The functionalist premise of disengagement theory prescribes mutual disengagement of older adults and society. Individuals should become progressively detached through the loss of roles, particularly after retirement and widowhood, both epitomised as rites of passage leading to disengagement from paid work and family. However, disengagement theory has been widely criticised for being simplistic and overgeneralising, due to its blindness to the wide variation of experiences of ageing and its pessimism, as older adults' withdrawal from society is neither inevitable nor necessary (Maddox 1965). Despite its pitfalls disengagement theory has influenced, the more recent selective optimisation with compensation theory of successful ageing (Baltes & Baltes 1990). This theory, which is less prescriptive in character,

hypothesises that as people age, they tend to withdraw from less important roles, in order to devote more time and energy on fewer selected activities.

Activity theory, developed in antithesis to disengagement theory, prescribes maintenance of levels of engagement of middle age into later life (Havighurst 1954, 1961). This theory posits that "successful aging means the maintenance as far and as long as possible of the activities and attitudes of middle age" (Havighurst 1961). Therefore, once individuals retire from paid work, they should substitute employment and any other activities they discontinued with new activities. This perspective represented an early conceptualisation of a positive view of ageing (Johnson & Mutchler 2014). Criticism levelled against activity theory stated that it is mostly prescriptive and takes an overly optimistic stance, not acknowledging the existence of structural barriers to being active in later life (van Dyk 2014).

In the 1970s, the continuity theory of ageing (Atchley 1971, 1989) challenged disengagement and activity theories over their conceptualisation of old age as a distinct life stage from middle age, separated by the watershed of retirement. It proposed that older adults tend to retain their self-esteem and values, preferring to maintain their former social roles and activities in later life. Therefore, emphasis is placed on levels and types of activities earlier in the lifecourse, as prior engagement determines individuals' participation in paid and unpaid activities. Continuity theory does not prescribe to maintaining stability in social roles or activities in the post-retirement period, rather it proposes adaptation according to past experiences and current resources (Palmore 2017). However, analogously to activity theory, continuity theory does not recognise social and environmental constraints of individuals' ability to maintain continuity.

All three aforementioned theories, have been deeply influential in spearheading the idea of social roles within social gerontology (Victor 2004). The main concern of disengagement, activity and continuity theory revolves around individuals' adaptation to changing social roles caused by retirement, widowhood or declining health. However, they perpetuate a negative view of later life, as they imply inevitable losses to which people need to adapt. These theories were also early attempts to define the concept of successful ageing as they prescribed different ways to age successfully (Atchley 1989; Havighurst 1961). The concept of successful ageing re-emerged in the 1990s, emphasising three aspects: low likelihood of disease, higher functional and cognitive ability, and active engagement with life

(Rowe & Kahn 1997). Another pitfall of disengagement, activity and continuity theories, is that they are not conducive to the generation of testable hypotheses, as their propositions are geared towards prescribing an ideal way of ageing (Victor 2004, p.41-42). Nonetheless, these theories are useful as they provide interpretative frameworks to understand changes in engagement in paid and unpaid work from mid to later life.

In contrast to the structural-functionalist theories of ageing, conflict theories, such as the structured dependency theory and the political economy of ageing, focus on the ways in which societies tend to marginalise older adults (Biggs *et al.* 2003). Structured dependence theory challenges the ideological grounds of functionalist theories, contesting the state of dependency and loss of older people as unavoidable (Townsend 1981; Walker 1980). Rather, it emphasises the role of institutional contexts and structural factors in marginalising older people through retirement and social policies. Dependency among older people is viewed as socially constructed, as retirement and pension policies contribute to the exclusion of older adults' from participating in the paid labour market. The political economy of ageing reaches similar conclusions on the nature of ageing in capitalist societies, as it proposes that being older is not a matter of biology or chronological age, but a consequence of older people's relationship to labour (Estes 1986; Walker 1981). This perspective frames political and social institutions as critical in defining later life, through social policies that contextualise the experience of older age.

4.2.2 Bringing the young-old and the third age into the spotlight

In the 1970s and 1980s, the emergence of a relatively affluent and healthy cohort of older adults unburdened by responsibilities of employment, was perceived as part of a trend that might reshape the meaning of retirement (Victor 2004). In this regard, two innovative concepts described this new trend: the definition of the "young-old" as a separate group from the "old-old" (Neugarten 1974), and the "third age" (Laslett 1987). These concepts promoted the idea of a novel lifecourse stage which offered the opportunity to spend more time in good health and to engage in self-fulfilling activities, such as participation in volunteering and leisure.

The young-old were conceptualised as dwellers of a novel lifecourse stage, sitting between the middle aged and the old-old. The young-old comprised individuals aged between 55 to 75 circa, who are "relatively healthy, relatively

affluent, relatively free from responsibilities of work and family and who are increasingly well educated and politically active" (Neugarten 1974). Compared to their predecessors in previous generations, they enjoyed healthier lives and, notwithstanding that, they seemed to retire earlier - Neugarten notes how men's participation in the labour market in the US census drops after the age of 55 and some professions offer options to retire to people in their 50s (Neugarten 1974). As individuals are free from work after retirement, Neugarten emphasises that there is space for a new stage that allows individuals to participate in society in innovative ways, different from patterns of work typical of middle age (Neugarten 1974). In this conceptualisation, the young-old are seen as an opportunity to positively redefine old age. Regarding the young-old, Neugarten states:

> "with their relative good health, education, purchasing power, free time and political involvement, they are not likely to become the neglected, the isolated or the expendables of the society. Will they, instead, become the social contributors, as well as the self-fulfilled? Will they be the first to create, on a large scale, new service roles and to offer their services to the community without regard to direct financial remuneration?" (Neugarten 1974, p.198)

While the concept does not specify what types of unpaid work the young-old would be participating in, it represents a precursor for later concepts that advocated for longer working lives, such as that of encore careers (see section 2.3.3) (Freedman 2007).

While the third age shares some important features with the concept of young-old, it does not make any specific reference to boundaries defined by chronological age (Laslett 1987). Broadly, the third age is theorised to precede the fourth age, characterised by decrepitude and death, and to follow the second age, characterised by independence and employment (Laslett 1987, 1989). As a novel lifecourse stage, Laslett predicted that it would emerge in advanced industrialised countries as a consequence of older adults living longer lives in better health and shielded from poverty by the emerging social institutions of retirement and pensions (Laslett 1987). Supporting this theory, Gilleard and Higgs (2002) reported that in Britain a segment of the older population seems to enjoy higher income and wealth, and a higher consumption of leisure goods and services in the post-retirement period. By contrast, the experience of old age in previous centuries, used to be characterised by indigence and ailing health (Gilleard & Higgs 2002).

The concepts of young-old and third age are appealing, as they provide a way to rethink old age, emphasising the possibilities of what older adults can achieve, rather than focusing on losses. During the third age, individuals are able to redefine their participation in society independently of paid employment, freeing

opportunities for involvement in leisure activities and roles in the unpaid labour market that reflect their interests. However, the ideals of these concepts overlook the heterogeneity among older adults in terms of socioeconomic status and gender. As acknowledged by Laslett, experiencing the third age requires resources that not all individuals possess, such as cultural capital, financial resources and good health (Laslett 1991, p.25). In addition, both concepts seem to ignore the different lifecourse of women who, especially among the older cohorts, are less likely to have experienced continuous careers in the paid labour market. As women are more likely to provide informal care and perform unpaid housework throughout their lifecourse, retirement may bring more demands on their time, as the likelihood of providing informal care increases at later ages (Siegel & Laslett 1990).

4.2.3 Promoting engagement: from productive ageing to active ageing

Reflecting ideological socio-political changes, the 1980s witnessed the emergence of productive ageing in the US, which shifted the attention towards older people's potential to participate in paid work, rather than viewing retirement as a mere period of leisure. Productive ageing underscores older adults' potential for remaining engaged in productive activities, recommending that ageing societies should seize the opportunity to capitalise on older adults' ability to work for longer (Butler & Gleason 1985). This concept was conceived and further developed by Butler as a challenge to ageist stereotypes that view older people as unproductive, highlighting older adults' potential to contribute to society (Butler & Gleason 1985; Holmerova *et al.* 2012). In the US, the concept of productive ageing chimed with advocacy groups for older people, arguing against policies that restricted access to paid work at later ages (Bass *et al.* 1993). At the same time, the concept resonated with policymaker's concerns regarding the prospected increases in expenditures linked to ageing populations (Walker 2006).

While productive ageing challenged the deficit model of ageing, it was criticised for its excessively "productivist" view of ageing (Foster & Walker 2015). It has been argued that the actualisation of productive ageing in the media and policy spheres works in concert with neoliberal ideas directed towards individual responsibility, decreasing state dependency and privatisation of services (Rudman & Molke 2009). While different definitions of productive activities have been employed in this perspective, the majority focused solely on forms of work that produce goods and services valued in monetary terms, thus restricting productive

ageing to include only activities that can be quantified economically (Bass & Caro 2001; Walker 2002). Adding confusion regarding its meaning, other authors applied different definitions, with a literature review remarking that there is not a shared consensus on what activities should be included in the concept of productive ageing (Thanakwang & Isaramalai 2013). Nevertheless, productive ageing remains an influential concept for empirical studies on engagement in paid work, caregiving and volunteering in mid to later life (e.g. Bass & Caro 2001; Caro et al. 2009; Hank & Erlinghagen 2009; Hank & Stuck 2008; Hank 2011; Mergenthaler et al. 2018), and represents a precursor for the active ageing framework (Holmerova *et al.* 2012; Walker 2002).

Active ageing was developed by the WHO to promote healthy ageing and improve quality of life at later ages by emphasising the link between activity and health (WHO 2002). This concept has been popular among international organisations and governments. For example, the EU has underscored the importance of active ageing as a goal to reap the benefits of an older society, as 2012 was designated the "European Year for Active Ageing and Solidarity between Generations" (EU 2012). Unlike previous concepts, it is a policy framework that provides policy aims in the context of ageing societies, rather than a theoretical concept.

Despite its origins in the policy sphere, the active ageing framework also resonates within academia, as researchers have adopted this framework to guide empirical research on engagement in paid and unpaid work in later life (e.g. Deeming 2009; Di Gessa & Grundy 2014; Madero-Cabib & Kaeser 2016; Morrow-Howell et al. 2014; Zaidi & Stanton 2012; Zaidi & Howse 2017). Active ageing is intended as a more inclusive concept compared to productive ageing, since it does not focus exclusively on economically meaningful activities and considers ageing as a process occurring throughout the whole lifecourse, rather than being concerned only with the levels of engagement in productive activities among the young-old (Foster & Walker 2015). Foster and Walker (Foster & Walker 2015), expounded upon the holistic nature of this concept by formulating eight active ageing principles: all pursuits that enhance well-being regardless of their economic value; preventative health across the lifecourse; inclusiveness of older adults regardless of age and frailty, eschewing a focus on the young-old to the exclusion of the old-old; intergenerational solidarity and fairness; rights (e.g. social protection and lifelong

education) and obligations (taking advantage of the rights); participation and empowerment so that top-down policies enable bottom-up initiatives from citizens; consideration of national, cultural and ethnical heterogeneity; and finally, its consideration of changing norms on ageing, preferences, constraints, and structural inequities (Foster & Walker 2015; Walker 2002).

However, the ambiguity of active ageing in its practice within social policy has been remarked, since in some of its iterations it often becomes synonymous with productive ageing, assuming a unidimensional focus on economic productivity or, more rarely, on physical activities. Besides this ambiguity in the policy sphere, active ageing has been criticised by gerontologists for being exceedingly idealistic and implementing a process of "age denial and mid-life imperialism" (van Dyk 2014). While the concept challenges outdated deficit models of ageing, it has been argued that it imposes an exceedingly optimistic view of old age, which ignores the health difficulties faced by many older people (van Dyk 2014). Furthermore, active ageing may be a source of increasing inequality, since it imposes on older people the expectation of conforming to an active and healthy lifestyle, which is unattainable for some (Biggs *et al.* 2003). While socially advantaged individuals may have more opportunities for staying active, more disadvantaged individuals may have constrained choices, having to work for longer in poorer and tougher jobs (Vickerstaff 2010). Therefore, active ageing may result in a form of "new ageism" based on individual responsibility, rather than confronting negative stereotypes of old age (van Dyk 2014; Walker 2012). By placing the responsibility to age actively on individuals, those who succumb to ill-health and disability may face more discrimination due to their perceived failure to stay active and healthy (Timonen 2016). By contrast, achievers are seen to challenge negative stereotypes (Timonen 2016).

While the concepts and perspectives described in this section may not be useful to develop testable hypotheses, they shape the context of the research questions and provide frameworks to interpret the findings presented in the following chapters. The research findings (chapters six to eight) are particularly relevant to the concept of active ageing, as they provide an indication of the feasibility of promoting active ageing for every individual in mid to later life in the UK. Moreover, the research evaluates the extent to which engagement in paid work, volunteering and informal care provision in mid to later life differs according to

social advantage and disadvantage. Gender, social class, education and health status are considered as possible factors that determine individuals' engagement in mid to later life.

4.3 Role theory and microeconomic perspectives

4.3.1 Role theory

Social sciences have a long-standing interest in the interplay between social roles and how these affect individuals' lives, dating back to the seminal studies by Parson, Linton and Merton. Social roles were originally defined as behaviours expected from individuals who occupy a given status or position within a social structure (Linton 1936). Role theory further expounded the concept of social roles, specifying that individuals may occupy multiple roles simultaneously, with each role implying a different set of benefits, duties and obligations (Merton 1957a). While social roles benefit individuals, as they provide a way to integrate in the social structure, holding multiple roles may also lead to conflict, as individuals struggle to reconcile the obligations arising from each role (Merton 1957b). According to its basic premise, role theory implies that while roles have the potential for benefitting individuals, the combination of different roles may give rise to conflicts that may negatively affect individuals.

Two opposing perspectives have been included into role theory in order to explain how multiple roles may affect individuals. Role strain theory follows Merton's original idea of role conflict, theorising that occupation of multiple roles inevitably leads to problematic consequences, as individuals struggle to fulfil the duties that derive from a given role (Goode 1960). The only feasible solution is to consequently reduce or drop engagement in a given role. For example, an individual may need to fulfil obligations of providing informal care for a close relative, which may generate conflict by competing for the time that is dedicated to employment (Pavalko & Artis 1997).

By contrast, role enhancement, or role accumulation, theorises that the accumulation of multiple roles is beneficial for individuals (Sieber 1974). This perspective challenged role strain which emphasised the negative aspects of engagement in social roles, overlooking the beneficial effects. Hypothesised benefits include, acquisition of social status, prestige, resources, and personal growth. These rewards are theorised to not only balance, but outweigh the strains of social roles.

These perspectives have been used in the social and health sciences to formulate hypotheses regarding the health effects of role occupancy (e.g. Reid & Hardy 1999; Rozario et al. 2004). Role strain predicts that multiple role occupancy leads to detrimental health outcomes. By contrast, role enhancement would theorise that multiple role occupancy leads to better health outcomes.

The deterministic character of these perspectives has been criticised, with calls to heed closer attention to the characteristics and types of individuals' engagements (Marks 1977). For instance, on the one hand, caregivers have little control over their decision to provide informal care, as they may have to deal with sudden obligations arising from close relative's need for assistance due to ill health (Pearlin *et al.* 1990). On the other hand, volunteers have more control over whether they partake in volunteer work, and the amount of time they can spare. The role context hypothesis integrates the role strain and enhancement perspectives, stating that the circumstances and characteristics of social roles are more important than the number of multiple roles that individuals occupy for understanding the interplay between activities (Moen *et al.* 1989). In particular, role context proposes that roles and activities that provide higher levels of social support are more likely to have beneficial effects for health and wellbeing.

Additional nuance was added through the inclusion of role substitution and role extension hypotheses, used in empirical investigations that aimed at understanding whether different activities are competitive or complementary (Hank & Stuck 2008). The former, also known as "activity substitution" (Mutchler *et al.* 2003), hypothesises that individuals may undertake a new activity to substitute for the loss of another role. For example, role substitution hypothesises that a retiree takes-up volunteering in order to compensate for the role loss of employment. Therefore, one would expect the two activities to be inversely correlated. The evaluation of this hypothesis requires longitudinal data, as it is chiefly concerned with individual changes in roles over time. For example, in a cross-sectional design, a negative relationship between volunteering and employment, could be interpreted as an indication that the two activities are in competition for individuals' time as individuals substitute one activity for the other; or, selection effects could also explain the negative relationship if people who volunteer are less likely to participate in paid work to begin with. Only with a longitudinal design is it possible to begin to understand which mechanism is driving the relationship.

The role extension hypothesis proposes that engagement in different roles may be complementary, whereby partaking in one activity leads to a higher likelihood of participating in other social roles (Choi *et al.* 2007; Mutchler *et al.* 2003). This hypothesis, rather than emphasising the time constraints between activities, elaborates the aspects of social integration that lead to engagement in multiple domains. For example, people who are employed may be more likely to come into contact with volunteering opportunities through colleagues or professional networks (Wilson & Musick 1997). Similarly, Burr et al (2005) suggested that carers have more contacts with social networks that provide opportunities for volunteer work, as they found that they were more likely to volunteer than non-carers.

4.3.2 Microeconomic perspectives on informal care and employment

Perspectives from microeconomics have employed similar notions in the examination of the relationship between care and paid work, offering further conceptual tools to explain differences observed in empirical studies. A large body of literature has analysed a range of occupational outcomes for carers, using a number of concepts to formulate hypotheses and explain differences: substitution effects, income effects, respite effects, discrimination effects and opportunity costs (Carmichael & Charles 2003b; Heitmueller & Inglis 2007; Leigh 2010; Michaud *et al.* 2010; Pavalko & Artis 1997).

Similar to the role substitution hypothesis, substitution effects describe the situation whereby carers decrease the time they commit to paid work, or leave employment altogether, due to time constraints (Carmichael & Charles 2003b). This effect is also relevant for research that examines the opposite relationship, i.e. the effect of employment on engagement in care provision, although fewer studies have examined this relationship. The income effect refers to the situation whereby carers have a higher necessity of participating in paid work in order to meet the expenses that arise when caring for someone (Twigg and Atkin 1994, p. 42), driving the relationship in a positive direction. Some carers face increased household costs connected to the increased needs of the care receiver, e.g. needs for specialist equipment to assist someone who is sick or disabled (Dury 2014). Income effects underscore the implications of this research for social care services, as different welfare states provide different amounts of support for unpaid carers and individuals who require assistance. Thus, income effects may be more relevant in

welfare systems where social care is less defamilialised (i.e. more reliant on families, rather than the state, to provide unpaid care), such as the UK (Foster *et al.* 2017; Leitner 2003).

The respite effect is another mechanism that drives the care-employment relationship in a positive direction, as it hypothesises that carers may prefer to remain in paid work in order to have a pause from the demands of emotionally tasking caring duties (Parker 1993; Twigg & Atkin 1994). In situations where the care receiver requires high levels of support and assistance (e.g. dementia care), empirical evidence from qualitative studies suggests that some carers prefer to participate in paid work in order to have the workplace as a place to maintain social connectedness (Schneider *et al.* 2013). The discrimination effect describes the possibility that carers may decrease their labour market participation due to being paid systematically less than non-carers as a result of discrimination in the workplace. Findings from the BHPS suggest that, aside from the opportunity cost of reduced labour participation, carers are paid less, even when they are employed (Heitmueller & Inglis 2007). The authors suggest that this may be a form of wage penalty, whereby carers who require more flexible arrangements to accommodate their caring duties, are judged to be less committed by employers (Heitmueller and Inglis 2007, p. 20).

Another concept that has featured prominently in research on caring, and to a smaller extent in research on volunteering, is the notion of opportunity costs (Carmichael & Charles 2003b; Ettner 1996; Heitmueller & Inglis 2007; Herzog & Morgan 1992; Lee & Brudney 2009). This concept was introduced in the field of economics in the early 20th century, though the idea is said to have been anticipated by Benjamin Franklin who used the phrase "time is money" (Franklin 1748). Opportunity costs, which are used in finance to quantify the cost of investments in terms of forgone earnings that have been forfeited by not investing elsewhere, have been employed in time-use research to evaluate the time that individuals spend on unpaid activities, if that time would have been instead spent on paid work. For example, an individual who reduces the number of hours spent in paid employment to accommodate caring commitment, faces opportunity costs that vary according to the size of the foregone salary, i.e. the opportunity cost is higher for someone with a higher salary.

Opportunity costs have been used to understand differences that are observed in the relationship between caregiving and participation in the paid labour market according to individual characteristics. For example, due to lower opportunity costs, individuals with lower income would have a higher incentive to provide informal care, as the forgone cost of dedicating more time to unpaid care rather than employment is lower (White-Means 1992; Wolf & Soldo 1994). Similarly, it has been suggested that opportunity costs may provide a higher incentive for women to provide informal care as women "might have slightly less to lose" because of lower earnings compared to men (Mentzakis *et al.* 2009).

4.4 The lifecourse perspective and social roles

While role theory can be useful to make predictions on the effect of paid work on engagement in volunteering and informal care provision, its main pitfall is that it does not consider variations and changes in the roles performed by individuals across the lifecourse. Interrelationships between roles may change, especially in mid to later life where individuals may leave paid work and are more likely to become caregivers. In order to better understand how engagements in different activities interact dynamically over time, it is critical to integrate concepts from the lifecourse perspective into role theory.

The theoretical foundations of the lifecourse perspective have developed over several decades during the 20th century. A seminal study on the biographies of polish immigrants is regarded as the first example of a lifecourse approach (Thomas & Znaniecki 1918). However, it is only several decades later that the theoretical foundations for a lifecourse perspective are established through the analysis of the effects of the great depression of the 1930s on family trajectories (Elder 1975). The work of Elder and colleagues has been pivotal in guiding the theoretical development of the lifecourse approach (Crosnoe & Elder 2002; Elder 1992; Elder *et al.* 2003; Elder & Shanahan 2007). From the 1980s to the 1990s lifecourse sociology emerged as a discipline, focusing on the study of lifecourse patterns in given historical and social contexts (Elder 1992; Mayer 2009; Mayer & Müller 1986).

The lifecourse perspective focuses on the dynamic interdependency between individuals' biographies (e.g. employment, caring or volunteering trajectories), historical time and events (e.g. retirement), and institutional contexts (e.g. social policies) (Elder 1975; Elder *et al.* 2003; Elder & Shanahan 2007; Settersten & Mayer

1997). As a multi-faceted phenomenon, the lifecourse involves the interplay of multiple social roles and behaviours (e.g. engagement in paid and unpaid activities) that are embedded within past experiences, and are affected by age-graded norms (e.g. timing of retirement). The role of institutions and contexts is explicitly recognised in the lifecourse perspective as, for example, policies regarding the age of pension eligibility have the potential to affect the structure of individuals' lifecourses. The lifecourse can also be considered a social institution of itself, whereby individuals' trajectories of engagement in paid and unpaid forms of work, varyingly gravitate around a common trajectory defined by age graded norms regarding social roles (Elder 1995).

Two powerful concepts to depict lifecourses are those of trajectories and transitions (Elder 1992; Hutchison 2011). Trajectories focus on the long-term view of the lifecourse, as an individual's involvement in a given role or social institution is viewed as a concatenated series of states that span individuals' lifetimes. Elder and colleagues (2003) define trajectories as "sequences of roles and experiences defined by transitions or changes in statuses or roles". This concept, which shares some similarity with the notion of careers, may refer to employment, caring or volunteering trajectories, which for a given person are made up of the various spells where he/she has engaged in these activities. The term may also be used to define trajectories within a delimited life-stage. For example, retirement trajectories may refer to the changing employment statuses of individuals in the years preceding and following retirement. In the context of the research presented in this thesis, the focus lies in mid to later life trajectories of engagement in paid and unpaid activities.

Transitions, which are typically embedded within trajectories, refer to the events that delineate changes in states and social roles. For example, transitions in volunteering, include individuals taking-up or leaving engagement in voluntary work. Other commonly studied transitions include, entry in the labour market, marriage and becoming a parent. This concept is closely related to that of life cycle stages, which emphasises the passing of age graded life stages in the course of individuals' lifetimes (Alwin 2012). The concepts of trajectories and transitions provide a dynamic framework to understand the lifecourse, whereby unfolding trajectories are made-up transitions between states. However, this leads to the methodological challenge of modelling single trajectories, and also of understanding the interplay between multiple interdependent trajectories. For example, mid to

later life trajectories of employment, informal care provision and volunteering may interact with each other in different ways.

To handle the complexity of individuals' lifecourses, examinations in lifecourse research have generally followed one of two distinct paths of inquiry (George 2003). The first one, focuses on integrating principles and concepts from the lifecourse perspective into multiple areas of research (George 2003). Ample research in epidemiology has integrated the lifecourse perspective to conceptualise how the timing and accumulations of exposures that occur earlier in the lifecourse affect health outcomes in later life (Kuh *et al.* 2003; Power *et al.* 2013). Similarly, research in other fields has examined the "long arm" of specific events and transitions earlier in the lifecourse, such as the timing of births, on circumstances in later life (Grundy & Kravdal 2014; O'Rand *et al.* 1992; Pienta *et al.* 1994). The second type of inquiry, examines the lifecourse itself, aiming to understand the variation and heterogeneity between individuals' lifecourses (George 2003). This strand of research aims at understanding the heterogeneity of individuals' lifecourses as a collection of interdependent trajectories, by conceptualising the lifecourse as an age graded movement through interlocked configurations of social roles. However, a challenge of this research relates to the statistical methods available to researchers, as traditional regression or survival analysis is not adequate for modelling lifecourse pathways following this conceptualisation (Macmillan & Eliason 2003). Other methods that are more inductive and exploratory in nature, such as latent class models and sequence analysis, have been used in order to measure the heterogeneity of lifecourses (Corna & Sacker 2013; Hoekstra & Twisk 2015; MacMillan & Copher 2005; McMunn *et al.* 2015).

In this thesis, in order to model the interplay of mid to later life trajectories of engagement in multiple paid and unpaid activities, a two-staged latent class analysis approach is employed (see section 4.7.1 and 5.4 for more details). This method, whose theoretical foundation rests on the aforementioned concepts of transitions and trajectories (Macmillan & Eliason 2003), views engagement in multiple activities as interlocked age graded configurations that over time make-up longitudinal pathways. Using this method, distinct pathways of engagement in multiple activities can be identified, in order to assess the heterogeneity of individuals' engagement in paid and unpaid work in mid to later life. Furthermore, the results from the two-staged latent class analysis can be employed to evaluate

inequalities in engagement in paid and unpaid activities in mid to later life. The following section provides an overview of the lifecourse perspectives on socioeconomic inequalities, such as cumulative advantage/disadvantage theory, that herein constitute the theoretical basis for examining gender, socioeconomic and health inequalities in engagement in paid and unpaid activities.

4.5 Lifecourse perspectives on socioeconomic inequalities

As discussed in the background and the literature review chapters, different patterns of engagement in paid and unpaid activities may be affected and exacerbated by socioeconomic and health inequalities. Individuals who are advantaged (i.e. men, those in higher socioeconomic groups and in better health), may have a wider choice with respect to their engagement in paid and unpaid work in later life (Gonzales *et al.* 2015; O'Rand 1996). For example, individuals who are wealthier may be able to decide when they want to retire, and may be more likely to engage in volunteer work, potentially leading to better health. By contrast, those with fewer socioeconomic resources may need to work for longer, despite not having access to suitable job opportunities, and they may be more likely to provide long hours of informal care, given restricted access to social care services. Theories of inequality, such as cumulative advantage/disadvantage and cumulative inequality are relevant for the study of engagement in paid and unpaid activities in later life, as the promotion of active ageing may have different effects on individuals from higher and lower socioeconomic groups (Gonzales *et al.* 2015). However, little research has so far used these perspectives to examine how patterns of engagement in mid to later life are related to different axes of inequality. In contrast, ample research has documented how inequalities and advantage/disadvantage affect health (e.g. Bartley et al. 1997; Blane et al. 2004; Burton-Jeangros et al. 2015; Corna & Sacker 2013; Kahn & Fazio 2005; Ploubidis et al. 2014). Previous research has consistently shown that health is related to various socioeconomic factors, such as education, occupational status, and income level, often reporting the presence of health gradients according to relative socioeconomic position (e.g. Arber & Ginn 1993; Lynch 2008; Ploubidis et al. 2014; Marmot et al. 1991; Bosma et al. 1997; Wilkinson & Pickett 2006).

The concept of lifecourse accumulation is particularly important in the development of theory regarding persisting inequalities throughout the lifecourse

(Dannefer 2003; Ferraro & Shippee 2009). The cumulative advantage/disadvantage (CAD) theory describes the systemic tendency for inequalities to widen through time (Dannefer 2003). This concept calls back to the "Matthew effect" (Merton 1968) that is aptly summarised by the maxim "the rich get richer and the poor get poorer". According to CAD theory, prior disadvantage (lower availability of material resources and prestige), sets individuals on trajectories where they are more likely to experience further disadvantageous circumstances, while the opposite is true for advantage. The implication of CAD, which is framed as a population level process, is that socioeconomic inequalities diverge in older age, as time passes for a given cohort (Dannefer 2003). Since CAD had been formulated by Dannefer and O'Rand as a macro level theory (Dannefer 2003), cumulative inequality theory integrated this perspective into the lifecourse perspective to bridge micro, meso and macro level processes (Ferraro & Shippee 2009). Cumulative inequality theory proposes that "social systems generate inequality, which is manifested over the lifecourse via demographic and developmental processes, and that personal trajectories are shaped by the accumulation of risk, available resources, perceived trajectories, and human agency" (Ferraro & Shippee 2009).

Cumulative inequality provides a framework that can complement role theory by underscoring how advantageous and disadvantageous circumstances, shape opportunities for participation in paid and unpaid work in mid to later life. Despite the relevance of concepts like CAD and cumulative inequality to older adults' engagement in later life, currently the lifecourse perspective has been applied only to a limited extent in this research area (Gonzales *et al.* 2015). The application of a lifecourse perspective to investigate engagement in paid and unpaid activities at a later age would provide a better understanding of the engagement in paid and unpaid activities in the pre- and post-retirement periods.

4.6 Theories in volunteering research

A substantial portion of the extant empirical literature on volunteering has been conducted by sociologists who aimed at understanding the determinants that drive engagement in volunteer work. Unlike previous research on informal care (see section 4.3.2), the conceptual focus of volunteering research has not centred around the causal link with paid work; instead, theoretical approaches on volunteering provide frameworks that explain patterns of volunteering observed in the

population. Theories of volunteering include value based explanations, the resource perspective which considers how forms of capital affect volunteering, and rational-choice arguments that draw on exchange theory.

Value based explanations emphasise altruism as a key motive driving voluntary work (Hodgkinson & Weitzman 1996; Janoski *et al.* 1998; Kahana *et al.* 2013). This perspective stipulates that predisposing values drive individuals' motives to engage in volunteering. Since values mostly remain constant, individuals' volunteering behaviour is expected to remain constant over the lifecourse, with older volunteers becoming a self-selected group (Janoski *et al.* 1998). Consequently, value based explanations place considerable importance on explanatory factors early in the lifecourse, such as parental influences. Individuals may start volunteering earlier in the lifecourse because one or both parents were involved in volunteer work themselves and transmitted similar values to their children (Janoski *et al.* 1998; Rosenthal *et al.* 1998). However, evidence on a direct parental effect on adult volunteering is scarce (Rosenthal *et al.* 1998). In addition, most sociologists do not regard values as predisposing factors for engagement, but rather as constitutive elements of volunteering, which are gleaned from the volunteering work and provide meaning to it (Wilson 2000). For these reasons, more recent empirical work employed explanations that emphasise individual's resources, which instead predict changes in people's volunteering behaviour across the lifecourse, and variation according to individual characteristics, such as socioeconomic position (Lancee & Radl 2014; Wilson 2000).

The resource perspective considers volunteering as an activity that requires several types of resources from individuals, such as human and cultural capital (Oesterle *et al.* 2004; Wilson & Musick 1997). Individuals require resources to increase their value as potential volunteers, and to gain access to volunteer work opportunities. For example, individuals with higher levels of education and individuals in managerial professions may possess skills that are valued by volunteering organisations (Oesterle *et al.* 2004; Wilson & Musick 1997). Health is considered a resource essential to volunteers, as individuals who are healthier are more likely to partake in volunteer work (Li & Ferraro 2006). According to the resource perspective, volunteering shares some similarities with paid work, as individuals have access to more opportunities for both activities when they possess higher stocks of human and social capital, and good health (Lancee & Radl 2014).

Furthermore, as resource levels do not remain stable over time, this perspective allows for individuals' potential in changing their volunteer behaviour over their lifetime.

Rational-choice arguments suggest that people weigh costs and benefits in decisions to engage in volunteer work (Lee & Brudney 2009). Therefore, when the costs of volunteering are higher relative to the benefits, individuals are less likely to volunteer, and vice versa (Butrica *et al.* 2009). Volunteers follow their personal interest, rather than volunteer work being a completely selfless act of charity. The underlying assumption of this perspective is that individuals engage in volunteering to derive a specific reward or benefit. Rewards may include the acquisition of new skills, making new social contacts, and integrating within a community (Lancee & Radl 2012). Similar, to the resource perspective, rational choice arguments imply that volunteering behaviour is not stable throughout the lifecourse, as individuals' interests are subject to change over time.

4.7 Objectives and research questions

The overarching objective of this Ph.D. thesis is to examine and characterise older adults' engagement in paid work and unpaid activities (informal care provision, volunteering) over time from mid to later life. Moreover, within this broader aim, the research presented in this thesis pursues two specific objectives, reflecting two differing approaches: one that is person-centred and the other that is variable-centred (Laursen & Hoff 2006). The first approach employs two-staged LCA in order to model individuals' mid to later life pathways of engagement in multiple paid and unpaid activities (see section 4.7.1 for detailed research questions and chapter six for the findings). Using a person-centred approach, it is possible to uncover distinct pathways of engagement in multiple paid and unpaid activities in later life, identifying clusters of individuals who adopt similar patterns of engagement from mid to later life. While this approach allows the modelling of the complexity and nuances of how individuals combine engagement in multiple activities over time, as a person-centred approach, it is an inductive method, which is not suited to assess causal relationships (Laursen & Hoff 2006).

The second approach, examines the effect of employment status (full-time, part-time, self-employment) on engagement in volunteering and informal care provision (see findings in chapters seven and eight) in mid to later life (see detailed

research questions in section 4.7.2). Within-between random effects models are used in order to disentangle the selection effects from direct influences, in order to gain insights into the causal relationship; that is, how participation in paid work impacts engagement in caregiving and volunteering. Exploiting the nature of longitudinal data, this approach separates between- and within-person variability in order to provide a novel insight into the relationship between employment status and engagement in volunteering and informal care provision.

4.7.1 Pathways of engagement: a person-centred approach

The first main objective of the research is to explore how individuals combine multiple paid and unpaid activities from mid to later life (ages 55 to 70). Using a person-centred approach, the research identifies distinct groups of individuals that have similar paths of engagement in multiple activities. This objective extends previous cross-sectional research that has investigated how individuals combine engagement in multiple activities in mid to later life (Burr *et al.* 2007; Fernandez-Ballesteros *et al.* 2011; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014), by employing two-staged LCA that allows modelling of interdependent longitudinal trajectories, identifying distinct pathways of engagement. In the first stage of this approach, cross-sectional latent class models are employed to identify distinct configurations of multiple activities at each 2-year age period, from the age of 55-56 to 69-70. The second stage uses the latent variables produced in the first stage to generate longitudinal pathways of engagement in multiple activities from ages 55 to 70, by combining the conditional probabilities of the two stages. This approach developed in lifecourse research, allows the modelling of interdependent trajectories and their age graded change over time (Corna & Sacker 2013; MacMillan & Copher 2005; Macmillan & Eliason 2003).

As argued by previous research, several multiple unpaid activities should be considered in order to better model configurations of engagement in paid and unpaid work, as this provides a more realistic portrayal of engagement in mid to later life (Dury *et al.* 2015; Morrow-Howell 2010). For this reason, as well as examining employment, volunteering and informal care, other unpaid activities that have been shown to be important when examining the latent structure of engagement in multiple activities are included in the models (i.e. housework and civic participation) (Burr *et al.* 2007; Dury *et al.* 2015; Mergenthaler *et al.* 2018; Putnam *et al.* 2014). The concept of civic participation refers to passively

participating in local groups or voluntary organisations, rather than actively doing work for such organisations. While the concepts of volunteering and civic participation are similar, sociological research tends to distinguish these two activities (Wilson 2000).

After examination of the mid to later life pathways of engagement, the relationship between engagement pathways and individual characteristics (gender, cohort, marital status, education, housing tenure, income, subjective financial status and health) is shown, in order to examine how engagement in paid and unpaid activities is related to gender, socioeconomic and health inequalities in mid to later life. The specific research questions are as follows:

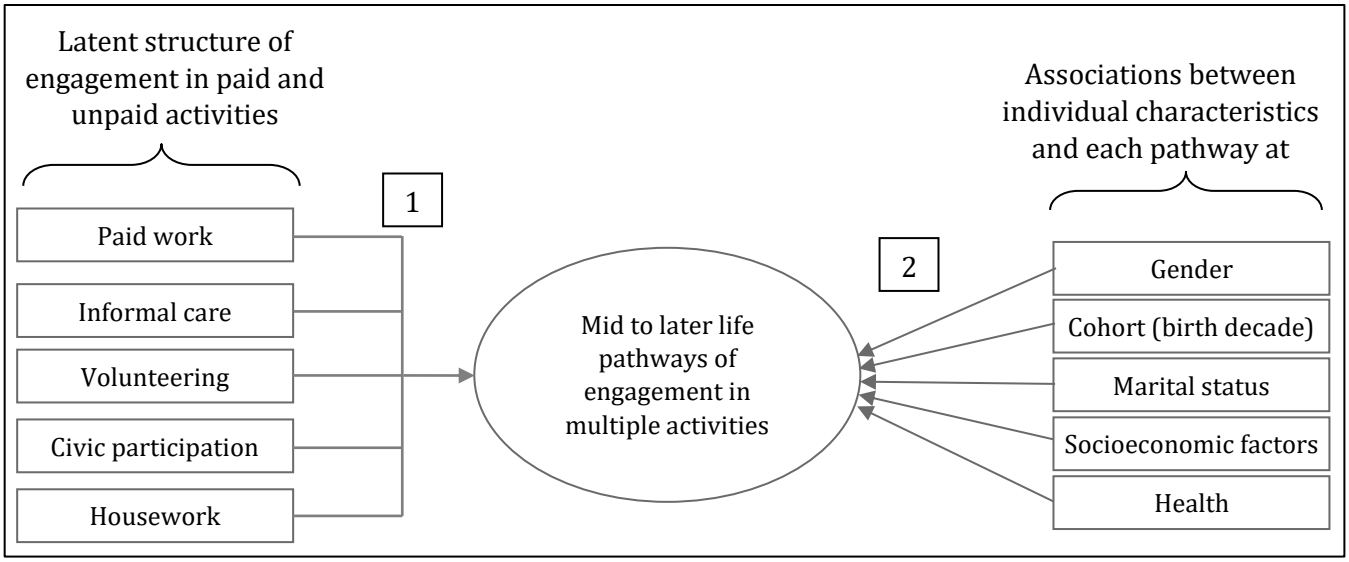
1) How do individuals combine engagement in multiple paid and unpaid activities (paid work, volunteering, informal care, housework, and civic participation) over time, from mid to later life?
2) How do these pathways of engagement relate to gender, socioeconomic and health inequalities?

A conceptual diagram of the proposed research approach is shown in figure 4-1. The left-hand part of the diagram shows the interrelationships between activities in mid to later life, making up the latent pathways in engagement (fig. 4-1 [1]). Considering theoretical approaches and previous evidence we expect that paid and unpaid work may be combined in different ways. Previous research has often identified a very active group of individuals who combine several unpaid activities, a group who focuses mostly on paid work, and a group with low levels activity levels (Burr *et al.* 2007; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014). The longitudinal approach permits us to identify whether individuals' patterns of engagement in paid and unpaid activities change over time. We expect that while for a group of individuals, engagement pathways may show paid work to be in competition with unpaid activities (role substitution), other pathways may reflect the experience of individuals who are more likely to combine engagement in paid and unpaid activities. Also, as suggested by previous research, some individuals may engage in progressively fewer activities as they age, as they might apply the selective optimisation with compensation strategy (Baltes & Baltes 1990; Burr *et al.* 2007).

The right-hand part of the diagram shows the relationship between sociodemographic characteristics and health with each engagement pathway (fig. 4-

1 [2]). Using a multinomial regression model to evaluate these relationships, results provide an insight into the importance of gender, socioeconomic and health inequalities in engagement. According to the cumulative inequality theory, we expect that individuals who have higher socioeconomic status, are more likely to engage in activities that are discretionary, such as civic participation and volunteering. Individuals in better health are expected to be more likely to engage in volunteer work, as predicted by the resource theory of volunteering. Conversely, we expect that those with lower socioeconomic background follow pathways that are characterised by caregiving and lower overall engagement. As caregiving is not a discretionary activity, individuals with fewer resources may be more likely to partake in this activity, as they may not have the means to purchase assistance from paid services (Dury 2014; Rostgaard & Szebehely 2012). Individuals with lower socioeconomic status and worse health may also be less likely to fall into pathways that are characterised by volunteer work, due to possessing lower resources (e.g. human capital) that according to theories of volunteering are often needed to participate in volunteering.

Figure 4-1. Conceptual diagram for the mid to later life pathways of engagement in paid and unpaid activities



4.7.1 Longitudinal relationship between paid work and engagement in volunteering an informal care provision: disentangling direct influences and selection effects

The second principal objective of the thesis is to examine the relationship between employment status (out of work, part-time, full-time, self-employment) and engagement in volunteering (Monthly or weekly) and informal care provision (any or more than 20 hours per week) in the years preceding and following the SPA (55-70). Longitudinal models evaluate the contemporaneous effect of paid work on engagement, as well as the effect at follow-up, i.e. the relationship between prior employment on volunteering and caring at the following wave. WB-RE models, also known as hybrid models, are employed to examine the causal and selection effects that drive the relationship between paid work and engagement in these two unpaid activities. This research provides novel evidence, adding to the literature on engagement in informal care provision and volunteering, by showing how these activities are affected by employment status in mid to later life, differentiating the effect of part-time, full-time and self-employment on different levels of engagement (see findings in chapter seven and eight). The specific research questions are as follows:

3) What is the relationship between paid work (not employed, self-employment, part-time and full-time paid work) and engagement in volunteering and caring in mid to later life, and are there differences by gender?
4) What is the relationship between paid work (t_{-1}) and engagement in volunteering and caring at follow-up (t_1), and are there differences by gender?
5) Does the effect of paid work differ according to frequency of engagement in volunteering (monthly and weekly) and intensity of care provision (any and at least 20 hours per week), and does this vary between men and women?

Figure 4-2 shows the conceptual diagram guiding the analysis. Models regress the main independent variable, employment status on the outcomes, volunteering and informal care provision, controlling for confounders. Additional longitudinal models deal with reverse causality, by lagging the employment status, which is measured at t_1 and t_{-1}. Furthermore, the within-between random effect specification of the model, decomposes the within and between variability to disentangle direct influences and selection effects (see section 5.5.2 for more details

on the statistical technique). The confounders have been selected according to previous literature (reviewed in section 3.3 and 3.4), which shows that these factors are related to both employment and engagement in volunteering and care provision, and do not lie on the causal pathway. The models presented in chapters 7 and 8 show the unadjusted as well as three adjusted models, so that it is possible to observe how covariates affect the main relationship of interest. Figure 4-3 shows the order in which the covariate are entered in the models.

In order to examine the nuances of these relationships, longitudinal analyses assess the relative contributions of direct influences and selection effects. Most previous longitudinal literature on the relationship between paid work and caregiving, focused on estimating causal influences by utilising methods that wholly discount selection effects from the main estimate (e.g. fixed effect models), in order to get as close as possible to making causal inferences. However, a lifecourse perspective argues against statistical approaches that handle selection as merely a methodological nuisance (George 2003; Macmillan 2005; Macmillan & Eliason 2003). For example, Linda George states that:

> "From a life course perspective, social selection is not a methodological nuisance. Rather, it is the heart of life course research, which is intended to delineate the long-term pathways associated with outcomes of interest. […] Many investigators who address social selection and social causation from the traditional perspective apparently fail to understand that they are attempting to eliminate the life course from their inquiries." (George 2003)

Furthermore, significant effects of employment status on engagement in volunteering and caring that are solely due to selection effects, would still carry substantial implications from a policy perspective, as they would suggest that policies that aim to extend working lives and promote active ageing need to focus on upstream factors earlier in the lifecourse (Komp & Johansson 2015b). For example, a competitive relationship between full-time employment and engagement in caregiving that is due to direct causal influences, would suggest that extending working lives would most likely restrict the pool of available carers. However, a competitive relationship that is due to selection effects would indicate that individuals who work full-time are less likely provide informal care, which would also carry negative consequences for the pool of informal carers; however, policies concerned with informal care may need to address factors earlier in the lifecourse that predispose individuals to work full-time and not to provide informal

Figure 4-2 Conceptual diagram for the relationship between employment status and engagement in volunteering and caring.

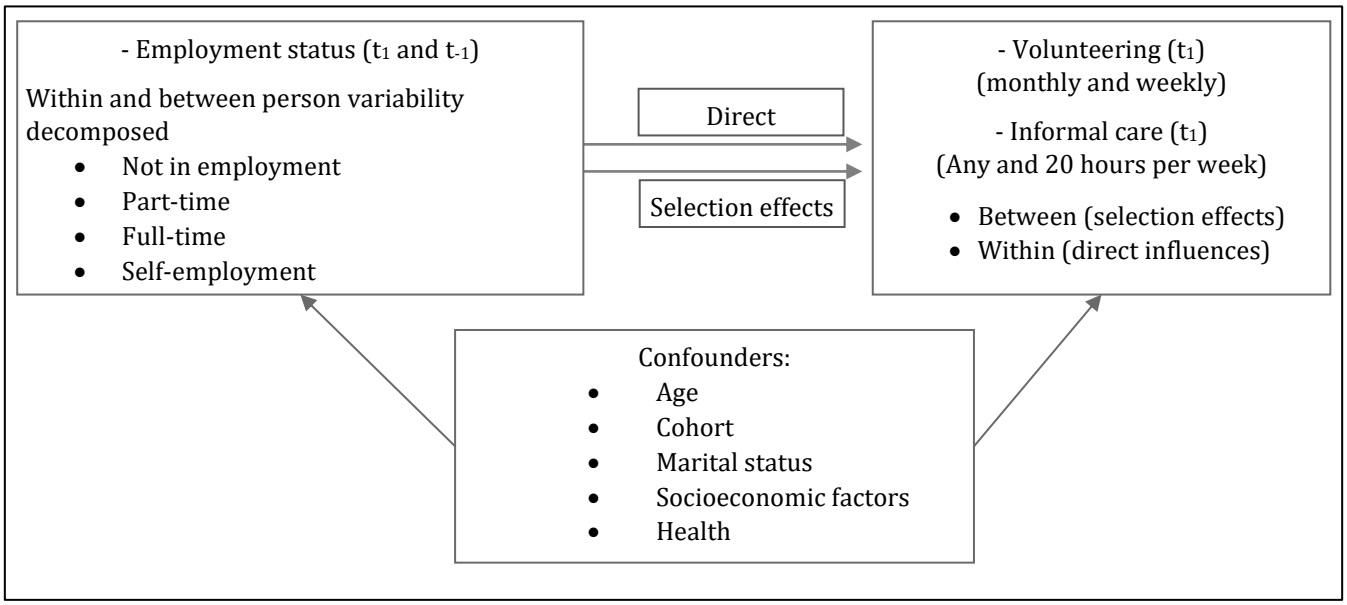
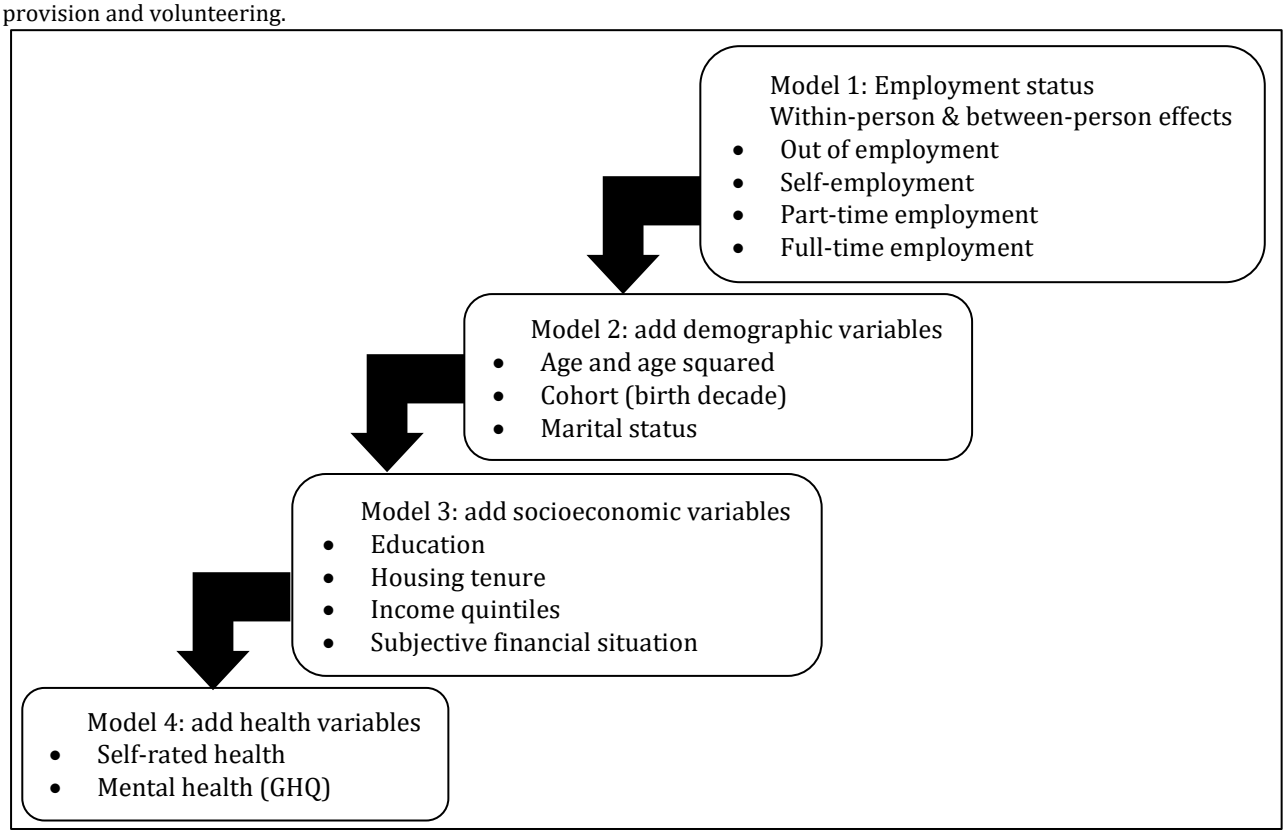


Figure 4-3. Modelling framework for the relationship between paid work and engagement in informal care provision and volunteering.



Notes: the diagram shows the order of the covariates that are used in the models that report the likelihood of engaging in volunteering and informal care provision in chapters 7 and 8.

care. Therefore, it is fundamental to examine the relationship between employment status and engagement in volunteering and informal care provision, using an approach that does not lead to biased results, while at the same time, not being excessively reductionist by completely discounting selection effects. Using longitudinal data and between-within random effects models, we evaluate the prospective relationship between paid work and volunteering, disentangling the portion of the relationship that is due to differences between individuals (selection effects), and differences within individuals over time to ascertain the causal relationship between these activities. This approach yields interpretable estimates for the direct influence of the independent variables and for the part of the association that reflects selection effects (Bell & Jones 2015b).

We expect that individuals in full-time employment are less likely to engage in volunteering and informal care provision, while the opposite is for those out of employment. According to role substitution, individuals substitute full-time employment for engagement in unpaid work as a result of time constraints. Therefore, we expect that within person estimates, reflecting direct influences, show a negative relationship, which becomes stronger for higher intensities of care provision and frequency of volunteering, as time constraints may increase. However, as suggested by previous research, participation in part-time and self-employment may be positively related to engagement in unpaid activities, as predicted by role extension. This positive relationship could be driven by selection effects (i.e. significant between-persons estimates), as individuals who work in part-time work and self-employment may be a selected group of people who are generally more likely to be engaged in unpaid activities throughout the lifecourse.

The relationship may also differ by gender. Women, who are less likely to have had continuous careers in full-time employment throughout their adult lives, are more likely to have lower earnings in later life (Adams *et al.* 2016). Thus opportunity costs may suggest that they could have a lower incentive to remain in paid work and not undertake unpaid activities (Carmichael & Charles 2003b; Robards *et al.* 2015). Therefore, opportunity costs may affect within person estimates of the relationships between employment status and engagement in informal care and volunteering. Lifecourse factors may also affect caregiving in mid to later life differently for men and women. Previous research suggests that women are more likely to provide informal care regardless of employment status, as they

are more likely to have combined engagement in paid and unpaid work earlier in the lifecourse (Moen *et al.* 1994; Robison *et al.* 1995; Young & Grundy 2008).

4.8 Conclusion

This chapter has reviewed relevant theories and provided a detailed outline of the objective of the research presented in the chapters that follow. Given previous evidence is interdisciplinary, theories from various fields and research areas have been reviewed. Concepts from the lifecourse perspective have been integrated into role theory in order to formulate objectives that heed the nuances of individuals' engagement in paid and unpaid work in mid to later life. While social gerontological theories are not suitable to formulate testable hypotheses, these have been reviewed as they are considered in the discussion chapter to interpret the findings. The following chapter outlines the data and methods used to answer the research questions.

Chapter 5

Data and Methods

5.1 Introduction

Chapter four provided an overview of the theoretical frameworks, and outlined the research questions along with the theoretical approach. The analysed datasets, the measures and variables used in the models, and the statistical methods employed to model the data, are described in this chapter. The following section (section 5.2) describes the BHPS and its continuation, the UKHLS. The characteristics of the BHPS sample, including information on the response and retention rates, sampling design, and representativeness of the British population, are outlined. Only a brief overview of the general UKHLS sample is provided, as the chapter focuses on the information that concerns the continuation of the BHPS sample into the UKHLS, as the rest of the UKHLS sample was not used for this research (section 5.2.2). Section 5.3, provides details of the variables and the measures which were used, including their derivation and the rationale for using and recoding variables. In section 5.4, the 2-staged LCA approach that was used to model the pathways of engagement in paid and unpaid work in mid to later life (results presented in chapter six) is outlined. This versatile statistical method has the advantage of allowing the modelling of interdependent trajectories in multiple activities. Section 5.5, describes the within-between random effects (WB-RE) models, also known as hybrid models, that were used to estimate the effect of participation in paid work, on engagement in volunteering and caregiving in mid to later life (findings presented in chapters 7 and 8). In particular, the advantage of this approach compared to the traditional random effects and fixed effects models, which have been traditionally used to model repeated measures data, are outlined.

5.2 Data

5.2.1 The British Household Panel Survey

The BHPS collected individual-level data annually from households in the UK from 1991 to 2008 (Taylor 2010). The sample was designed to be representative of the 1990 UK population, south of the Caledonian Canal - i.e. the “Essex” sample - excluding the northernmost part of Scotland. In the first wave of the BHPS 10,264 individuals (95% of eligible adults over the age of 16) in 5,538 households, were interviewed using a two-stage stratified sampling design. Individuals were followed up in subsequent waves regardless of whether they stayed in the same household.

New households were added to the panel if they included an original sample member who was interviewed in wave one.

The BHPS is a multidisciplinary survey that collected prospective longitudinal information, including demographic, economic, social and health-related data. In addition to prospective longitudinal data, retrospective life histories were collected in the second (1991), tenth (1999) and eleventh (2000) waves. These data provide information on labour market spells (including occupational class), all marital events and details of family formation from when respondents first left full-time education. Booster samples were added for Scotland, Wales and Northern Ireland in 1999 and 2001 to allow for regional analysis. In addition, the European Community Household Panel (ECHP) "low income" subsample (n=1710) was included from wave 7 to 11. After 2008, the BHPS sample was included in the larger longitudinal study, the UKHLS (Buck & McFall 2011; Knies 2014; Lynn 2009). While data collection for the UKHLS started in 2009, the BHPS was incorporated into this study only from its second wave, in 2010 (see further details on the UKHLS in the following section 5.2.2).

For each wave, the fieldwork period of the BHPS was concentrated between September and April of the following year, with the majority of the interviews taking place before December. For instance, in the first wave, interviews started on the 1st of September 1991, with all the interviews taking place by December 1991. Households who refused to be interviewed were offered a telephone interview from wave 3 onwards. For the main questionnaire, participants were mostly interviewed face-to-face. Individuals who were not available to be interviewed during the whole data collections, i.e. proxy responders, could nominate another household member to respond on their behalf. A shorter questionnaire was used for respondents interviewed via telephone.

The first wave of the BHPS, in 1991, achieved a household-level response rate of 69% (5,143 out of 7,491 households), when considering households where every household member, including proxy respondents, was interviewed (pp. A4-28, Taylor 2010). Excluding proxy respondents, i.e. including only households where every member had a full interview, the response rate drops to 65%. If every household where at least one individual had a full interview is included, a response rate of 74% was achieved (5,538 out of 7,491 households).

When considering retention, only individual response rates can be calculated, as in the BHPS there is no concept of a longitudinal household, since individuals, not households, are followed over time. A number of rules were used in the BHPS to assess the eligibility status of participants at each subsequent wave. Any individual eligible to be interviewed in wave 1, was considered an original sample member (OSM), which meant he or she was eligible to be interviewed for all subsequent waves provided they still resided in England, Wales or Scotland south of the Caledonian Canal. Participants were followed-up also when residing in institutions, unless circumstances were prohibitive, e.g. prison convicts and mentally impaired individuals. Any child born to an OSM automatically acquired the same eligibility status as an OSM, whereas any individual who cohabited with at least one OSM was considered a temporary sample member (TSM), eligible to be interviewed as long as he or she cohabited with at least one OSM (Taylor 2010, pp. A2-2). A TSM would acquire the status of permanent sample member (PSM), becoming eligible at every wave regardless of residence with an OSM, if he or she became a parent of an OSM new-born whose other parent is an OSM (Taylor 2010, pp. A2-2).

The wave-on-wave response rate for full-interviews, i.e. the proportion of people who were interviewed at any given wave out of those interviewed in the preceding wave, remained consistent for all waves ranging from a minimum of 86% in wave 2 (Taylor 2010, pp. A4-28) to a maximum of 95% in wave 18 (Taylor 2010, pp. A4-45). The response rate of respondent households out of effective eligible households remained consistent with response rates over 80% for all waves from wave two onwards (Taylor 2010, pp. A4-46). The longitudinal response rate of original sample members declined from 86% in wave two, to 44% by wave 18 (Taylor 2010, pp. A4-49).

Data from all the 18 waves of the BHPS have been used in the research presented in this thesis. However, as shown in table 5-1, information on volunteering and civic participation, was only available every other year from the sixth wave (1996) onward. From 2010 onwards, data from the BHPS sample component of the UK Household Longitudinal Study was used.

5.2.2 The BHPS sample in the UK Household Longitudinal Study

The UKHLS, also known as “Understanding Society”, is an ongoing annual

Table 5-1, Data collection of the BHPS sample and the key variables

Year	1991	‘92	‘93	‘94	‘95	‘96	‘97	‘98	‘99	’00	‘01	‘02	‘03	‘04	‘05	‘06	‘07	‘08	‘09	‘10	‘11	‘12	‘13	‘14	’15
BHPS data collection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
UKHLS data collection																			✓	✓	✓	✓	✓	✓	✓
UKHLS BHPS sample data collection																				✓	✓	✓	✓	✓	✓
Informal Care Variables	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Paid work Variables	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Volunteering Variable						✓		✓		✓		✓		✓		✓		✓		✓		✓		✓	
Civic participation Variables						✓		✓		✓		✓		✓		✓		✓							
Housework variable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: the BHPS sample was collected annually from 1991 to 2008 (waves 1 to 18). Its 19th wave was incorporated into the second wave of the UKHLS in 2010. Rules and questionnaire of the UKHLS applied to the BHPS from the 19th wave. For example, data collection on the civic engagement was dropped thenceforth.

panel study of the British adult population over the age of 16 - England, Wales, Scotland inclusive of north of the Caledonian Canal, and Northern Ireland (Knies 2014; Lynn 2009). The UKHLS is composed of four subsamples: a general population sample; an ethnic minority boost; the BHPS sample introduced in wave two of the UKHLS, which picks up data collection for the BHPS after the 18th wave in 2008; and an innovation sample for methodological research. The sample size of the UKHLS is much larger than the BHPS, as it includes information from 30,169 households collected in its first wave in 2009 (Knies 2014, pp.20). The multidisciplinary nature of the UKHLS is prominent as data from direct physical measurement and from biological samples, as well as socioeconomic and self-reported data, is collected, in order to bridge biomedical and social research (Buck & McFall 2011).

The BHPS sample was incorporated in the second wave of the UKHLS in 2010 (see table 5-1), which for the purposes of this thesis can be considered the 19th wave of the BHPS. The response rate for the BHPS subsample in the 2nd wave of the UKHLS was 77% - at least one person provided a full interview in 6,664 households out of 8,564 eligible households issued to the field. This is lower than what was achieved in previous waves of the BHPS, as response rates remained over 80% for all waves from the 2nd to the 18th waves of the BHPS (pp. A4-46,47 Taylor 2010). This drop may have been due to the change in the administration of the survey, with the resulting changes in logos, survey names and interviewers (pp.22, Knies 2014).

It is worth noting some differences in the data collection between the BHPS and the UKHLS. The data collection period of the UKHLS is considerably longer compared to the BHPS due to its larger sample size. The interviews in the UKHLS occur over a period of 24 months; thus the data collection for each subsequent wave partially overlaps. For example, the fieldwork for the first wave started on the 8th of January 2009 and ended on the 7th of March 2011 (Knies 2014, pp. 20). The fieldwork for the second wave, which included BHPS sample members, started on the 12th of January 2010 and ended on the 27th of March 2012 (Knies 2014, pp. 21). However, at every wave the data collection for the members of the BHPS subsample within the UKHLS has been concentrated in the first 12 months of the 24 months data collection period. Overall, the main difference to note is that there could be up to a two year gap between the 18th wave of the BHPS, which took place between September and December 2008, and the second wave of the UKHLS, which took place between January and December 2010 for BHPS sample members. Sensitivity

analyses were carried out in order to assess the impact of changes from the BHPS to the UKHLS (see tables A1, A2, B1 and B2 in appendices A and B).

The follow-up rules for inclusion of participants at subsequent waves differ to a small extent between the BHPS and the UKHLS studies. In the first 18 waves of the BHPS, any infant who was born to either an OSM mother or father, was automatically considered an OSM. In the UKHLS, however, only children born to an OSM mother became an OSM (Knies 2014, pp. 13). Consequently, only male TMSs, not female, who father a child with an OSM can become PSM (Knies 2014, pp. 20). From wave 19 of the BHPS – i.e. the second wave of the UKHLS – the follow-up rules of the UKHLS apply. However, this should not have any significant bearing on the results of this study as only people over the age of 55 were included in the analytical samples.

The objective of this thesis is to understand how paid work affects engagement in paid activities in the years leading up to and following the SPA. For this reason the analytical sample for all analyses was restricted to ages 55 to 70, as this is the period when most individuals retire from paid work. The same age range as been used in previous studies (Glaser & Grundy 2002; Jacobs *et al.* 2014; Verbrugge & Liu 2014). Restricting the analytical sample to a relative short age range allows us to understand how paid work affects engagement in unpaid activities during the years when individuals generally retire from paid work. Rather than considering exits from paid work as a single "cliff edge" transition, this approach takes into account the possibility of multiple transitions for each individual, as previous research has underscored the importance of viewing retirement as a process (Giandrea *et al.* 2009; Maestas 2010; Moen & Sweet 2004).

For the analyses presented in chapter six, data from every other wave, from the 6th to the 18th waves was used (1996-2008) to examine pathways of engagement in multiple paid and unpaid activities. Data from the UKHLS and the other BHPS waves could not be included for these analyses, because information on all unpaid activities (caregiving, volunteering, civic participation, and housework) was not collected during these waves (see table 5-1). In chapter seven, which examines the relationship between paid work and engagement in caregiving, every wave of the BHPS and the UKHLS was used (1991-2015), as data on caregiving was collected at every wave. In chapter eight, which examines the relationship between paid work and volunteering data from the following years is used: 1996, 1998, 2000, 2002,

2004, 2006, 2008, 2010, 2012, and 2014. Only every other wave of the BHPS and UKHLS, from 1996 onward, could be utilised, as data on volunteering was collected only during these waves.

5.3 Measures and Variables

This section outlines the measures used in the empirical chapters. Subsection 5.3.1 describes key variables: paid work, informal care provision, volunteering, civic participation, and housework. All five variables were used in the two-staged LCA in chapter six. Chapter seven uses paid work and informal care provision as main independent and the dependent variables, while chapter eight uses paid work and volunteering. Subsection 5.3.2 describes the covariates used in chapters six to eight. Gender, age, cohort, marital status variables were used as demographic covariates. Four variables were used to measure socio-economic status: education, housing tenure, household net-income quintiles, and subjective financial situation. Self-rated health, chronic health problems, and a mental health score were used to measure general health.

5.3.1 Key variables

Paid Work – The paid work variable used in chapters seven and eight comprises four categories: 0=not in paid work; 1=part-time self-employment; 2=full-time self-employment; 3=part-time employment 4=full-time employment. The paid work variable in chapter six is not able to consider self-employed workers into separate categories due to low numbers. The paid work variable used in chapter six therefore has three categories: 0=not in paid work; 1=part-time paid work; 2=full-time paid work. Participants who reported taking part in paid work during the previous week or who stated that they were away from paid work in the previous week, were asked: "Thinking about your (main) job, how many hours, excluding overtime and meal breaks, are you expected to work in a normal week?". Individuals who reported that they worked less than 20 hours per week were categorised as working part time. Those who reported at least 20 hours per week, were categorised as full-time workers. This cut-off was used as it is conventionally employed to distinguish part-time workers in cross-national comparative research (Fagan & O'Reilly 2002).

Informal Care Provision – Respondents were asked whether they provide regular service or help to someone who is sick, disabled or elderly. A binary variable identified those who reported that they provided informal (unpaid) care, including both co-residential and extra-residential care. The binary variable used in chapter six comprised the following categories: 0=not providing care; 1=providing any informal care. In chapter seven two different caregiving variables were used. The first indicator distinguished those who provided any informal care, similar to chapter six. The second indicator distinguished those providing at least 20 hour per week of care: 0=no care or less than 20 hours per week; 1= at least 20 hours of care per week.

Volunteering and Civic Participation – Engagement in volunteer work and civic participation were assessed with the following question: **"**We are interested in the things people do in their leisure time, I'm going to read out a list of some leisure activities. Please look at the card and tell me how frequently you do each one". Participants were asked how frequently they engage in unpaid volunteering work ("do unpaid voluntary work") and civic participation ("attend meetings for local groups or voluntary organisations") every other year between 1996 and 2008. For both questions, respondents were given five possible options: "at least once a week"; "at least once a month"; "several times a year"; "once a year or less"; "never or almost never".

In the UKHLS (i.e. from 2010 onward), only the question for volunteering was asked, and the question was somewhat different in comparison to the BHPS. From 2010 onward, respondents were asked: "In the last 12 months, have you given any unpaid help or worked as a volunteer for any type of local, national or international organisation or charity? Including any time spent at home or elsewhere, about how often over the last 12 months have you generally done something to help any of these organisations?" Respondents were given the following options: "on 3 or more days a week"; "twice a week"; "at least once a week"; "once a fortnight"; "at least once a month"; "quite often but not regularly"; "just a few times"; "one-off activity"; "helped or worked on a seasonal basis". While some of the options available to respondents are different between the BHPS and the UKHLS question, it is possible to produce similar variables assessing volunteering on a monthly and on a weekly basis. Sensitivity analyses show that the results from chapter eight are not different

after excluding the waves that use the UKHLS question (see appendix B, tables B1 and B2).

The question asking how often individuals attend meetings for local groups or voluntary organisations was used to indicate general civic participation. Although the concepts of volunteering and civic participation may appear to be similar, previous sociological research has distinguished those who report volunteering from civic participation (Chambré 1984; Wilson 2000). It has been argued that while the former produces goods or services, the latter instead is a consumer of the services provided by voluntary organisations (Wilson 2000). The wording of these questions aids this distinction, as the question asking about volunteering emphasises the active nature of the task by using the verb "do" and the noun "work", while the one about civic engagement emphasises a passive role as it specifies "attend meetings".

In chapter six the variables for volunteering and civic participation were coded as binary indicators to identify individuals who took part in these activities on a regular basis rather than occasionally: 0=never or almost never, once a year or less or several times a year; 1=at least once a month or weekly. In chapter eight, two binary variables were used for volunteer work. The first one distinguishes those who volunteer at least monthly, similar to chapter six. While the second distinguishes those who volunteer at least weekly: 0=never or almost never, once a year or less, several times a year, or monthly; 1=at least once a weekly. This was done to evaluate whether paid work may have a different effect on more frequent engagement.

Housework – Regarding the variable measuring housework, participants were asked "About how many hours do you spend on housework in an average week, such as time spent cooking, cleaning and doing the laundry". The variable measuring housework was trichotomised after inspection of the distribution: 0=0 to 10 hours per week; 1=more than 10 hours per week; 2=more than 20 hours per week.

5.3.2 Demographic, socioeconomic and health covariates

Gender – the variable for gender was used in chapter six as a covariate in the first stage, of the two-staged LCA (see section 5.4.1): 0=men; 1=women. The multinomial regression analysis that examines sociodemographic and health

characteristics of the engagement pathways in chapter six are stratified by gender. In chapters seven and eight, analyses are stratified by gender, given the different patterns of men and women's engagement in remunerated and unremunerated work.

Age – A variable for age is unnecessary in chapter six, which examines the paths of engagement in paid and unpaid work, given that the longitudinal data is manipulated into an age ordered structure, i.e. all the variables used in the two staged LCA are ordered by age, rather than by wave (see section 5.4). This is a setup that is commonly used for accelerated longitudinal designs (Galbraith *et al.* 2017). Age is used as a continuous variable in chapters seven and eight, where a regression based approach is used to assess the relationship between paid work and engagement in caregiving and volunteer work. Age squared is also included in the multivariate models to control for nonlinearities.

Cohort/Birth Decade - The cohort variable used here distinguishes those who were born before 1930=0, in the 1930s=1, 1940s=2 and 1950s=3. Considering that the analyses used data from 1991 (from wave 1 to wave 24), over a period of 24 years, it is important to account for cohort effects, since experiences at a given age made by individuals born in different cohorts may differ substantially due to period or cohort effects (Bell & Jones 2015a).

Marital Status - Information relating to marital status was collected annually. The marital status variable used here is an indicator that distinguishes those who are married or cohabiting=0, from those who are divorced=1, widowed=2 and never married=3. While there are slight changes to potential responses in more recent waves, such as the inclusion of civil partnerships, the implications for the cohorts of older adults, used in this analytical sample, are negligible. In chapter six, marital status at each individual's baseline was used. In chapter seven and eight, marital status was used as a time varying variable.

Highest Educational Qualification – Information regarding the highest educational qualification is updated at every wave in the BHPS and UKHLS and enables to distinguish: higher degree, first degree, teaching and other higher qualifications, nursing diploma, GCE A/O levels or equivalents, commercial qualifications, CSE grade 2-5, apprenticeship, other qualification and no qualifications. This variable was recoded into three categories: 0=high (higher degree, first degree, teaching and other higher qualifications, nursing diploma),

1=medium education (GCE A/O levels or equivalents, commercial qualifications, CSE grade 2-5, apprenticeship, other qualification) and 2=no qualifications. In analyses in chapter six, education at the baseline for each individual is used, while in analyses in chapters seven and eight the highest level of education attained is used as a time constant variable.

Housing Tenure – Housing tenure was trichotomized to distinguish: 0=outright homeowners, 1=homeowners with a mortgage, 2=renters (either privately, from a local authority, or from a housing association). In chapter six, the baseline for each individual was used. In chapter seven and eight, the modal housing tenure for each respondent was used.

Net Household Income Quintiles – Information on total household income in the month before the interview was utilised to create an equivalised measure of net household income divided into quintiles. The square root of household size was used as the equivalence scale (Levy & Jenkins 2012). Then, quintiles were calculated at every wave, in order to adjust for wave to wave inflation. The baseline for this variable was used in chapter six. In chapter seven and eight net household income quintiles was used as a time varying variable.

Current Subjective Financial Situation – A binary indicator was used to measure current subjective financial situation. Respondents were asked "How well are you managing your finances these days? Would you say you are…living comfortably/doing alright/just about getting by/finding it quite difficult/finding it very difficult". The measure was dichotomised into: 0= living comfortably/doing alright; 1= just about getting by/finding it quite difficult/finding it very difficult. The baseline for this variable was used in chapter six. In chapter seven and eight subjective financial situation was used as a time varying variable.

Self-Rated Health – In the BHPS survey respondents were asked "Please think back over the last 12 months about how your health has been. Compared to people of your own age, would you say that your health has on the whole been: Excellent/good/fair/poor/very poor". However, the same question was not asked at the 9th wave of the BHPS, and at every wave of the UKHLS. During these periods a similar question was used and harmonised with the other waves of the BHPS. Respondents were asked "In general, would you say your health is… Excellent/very good/good/fair/poor". The variable was dichotomised: 0=Excellent/very good/good; 1= fair/poor/very poor. This harmonisation for self-rated health is

analogous to what was done in previous research that harmonises the BHPS and the UKHLS (Platts *et al.* 2017).

Chronic Health Conditions - Additionally, a variable for reported disability or health problems connected with a list of ten conditions (problems on the arms, legs, hands, feet, back, or neck including arthritis and rheumatism; visual impairment; hearing impairment; chest / breathing problems; heart problems or high blood pressure; stomach problems; diabetes; epilepsy; migraine headaches; any other health problem) was used. This variable has been coded as a binary indicator comparing people who have reported at least one health problem, as done in previous BHPS based studies (Bartley *et al.* 2004; Booker & Sacker 2012; Corna & Sacker 2013; Sacker *et al.* 2006). This variable was used only for chapter six, as it was not asked to respondents in the UKHLS. The baseline measurement of this variable was used for each respondent.

Mental health/Psychological Wellbeing – The 12-item General Health Questionnaire (GHQ) score was used as a continuous variable to measure mental health (Goldberg *et al.* 1997; Goldberg & Williams 1988). This measure provides a score that ranges from 0 to 36, with higher scores indicating worse mental health. In chapter six, the baseline measurement for each individual was used. In chapters seven and eight this variable was used as time varying.

5.4 Modelling engagement pathways: two-stage LCA

This section outlines the two-stage LCA approach that was used to model paid and unremunerated work engagement pathways in mid to later life, which are presented in chapter six. This method is an extension of LCA, which allows the identification of common and distinct typologies of engagement in multiple activities over time. A brief description of LCA, which is the basic building block of the two staged LCA, is provided in subsection 5.4.1. Then, a detailed outline of the two-staged LCA approach is presented in subsection 5.4.2. Finally, subsection 5.4.3 describes the tests and model fit indices used to assess the LCA models.

5.4.1 Latent class analysis

In the first stage, unobserved configurations of engagement in paid and unpaid activities were identified using LCA. This technique is used to identify unobserved configurations of engagement in paid and unpaid activities. Clusters of

individuals who are homogeneous with respect to the observed variables of engagement in paid and unpaid activities can be identified in this manner (Nylund *et al.* 2007; Vermunt & Magidson 2004). This technique can be used to uncover latent unobserved configurations of engagement from observed variables on the single activities. After profiles of activities have been identified, multivariate analyses can be used to investigate the demographic, socioeconomic, and health characteristics associated with each latent variable of engagement in paid and unpaid activities, as done in previous studies (Burr *et al.* 2007; Morrow-Howell *et al.* 2014).

LCA is a statistical method that is commonly used to identify a latent categorical variable from multiple observed variables (Lazarsfeld & Henry 1968). Therefore, this person centred approach is particularly versatile for studying engagement in multiple activities, as it allows the identification of groups of individuals with different patterns of engagement that could not be identified with a variable centred approach. Furthermore, LCA has a number of advantages over other clustering methods, such as K-means. As LCA utilises maximum likelihood estimation, there are a several fit indices that are used to assess model fit, such as the Bayesian Information Criterion (BIC), the Akaike Information Criterion (AIC) and the Lo-Mendell-Rubin likelihood ratio test (LMR-LRT), compared to other clustering methods (Nylund *et al.* 2007; Vermunt & Magidson 2004). LCA is less restrictive as it does not require assumptions regarding linearity, normally distributed data and homogeneity of variance (Vermunt & Magidson 2004). However, LCA relies on the assumption of local independence, i.e. that the observed variables are assumed to be independent within each latent class. In the LCA model the probability of a given response pattern in c number of observed variables y is formulated as follow:

$$P(y_1, y_2, \dots, y_c) = \sum_{x=1}^{K} P(x = k)\, P(y_1|x = k) P(y_2|x = k) \dots P(y_c|x = k)$$

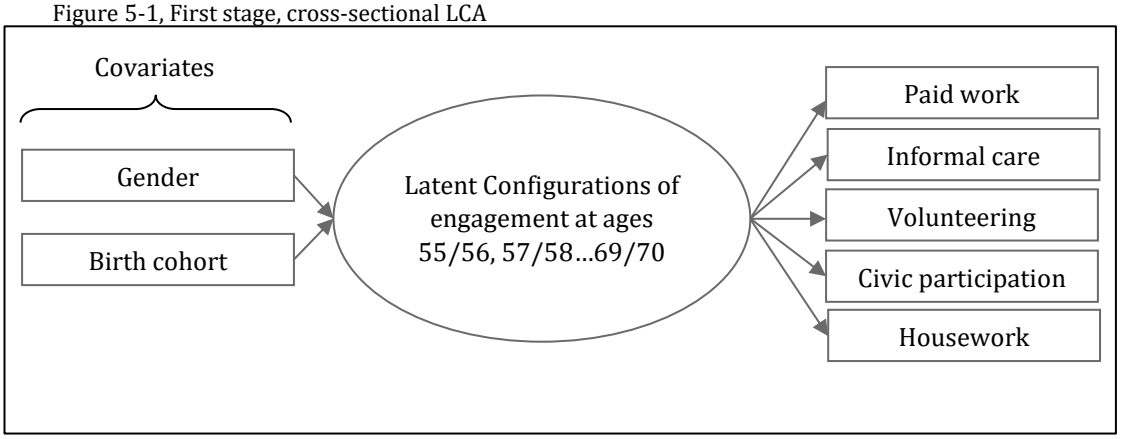
where x represents the estimated nominal latent variable with K number of classes, with k denoting a single class (k =1, 2, …,K). Therefore, this formula implies that the probability of observing a response pattern in the observed variables corresponding to a latent class, is equal to a weighted mean of the K number of latent class-specific probabilities $P(y_c|x = k)$.

5.4.2 Two-Staged Latent Class Analysis

The key variables used to identify pathways of engagement include: paid work, informal care provision, volunteering, civic participation and housework. Data for key variables used in the two staged LCA were taken from the following waves of the BHPS: 1996, 1998, 2000, 2002, 2004, 2006, and 2008. These variables have been coded to measure the status of engagement in each paid and unpaid activity at each age, from the age of 55/56 to 69/70. The status at two year age intervals was used due to the fact that data for volunteering and civic engagement were only available every other year.

In this study a two staged LCA approach, which is an extension of LCA, was used (Corna & Sacker 2013; MacMillan & Copher 2005; Macmillan & Eliason 2003). This method allows the examination of age graded pathways of engagement in paid work, informal care provision, volunteering, civic participation and housework from mid to later life. The technique is composed of two stages: the first one applies cross-sectional LCA models at selected ages (figure 5-1), while the second applies longitudinal latent class analysis models (figure 5-2). In the first stage, LCA models are applied to the observed variables, and this process is repeated at each age, at two- year age intervals. This process yields latent variables for the configurations of

Figure 5-1, First stage, cross-sectional LCA



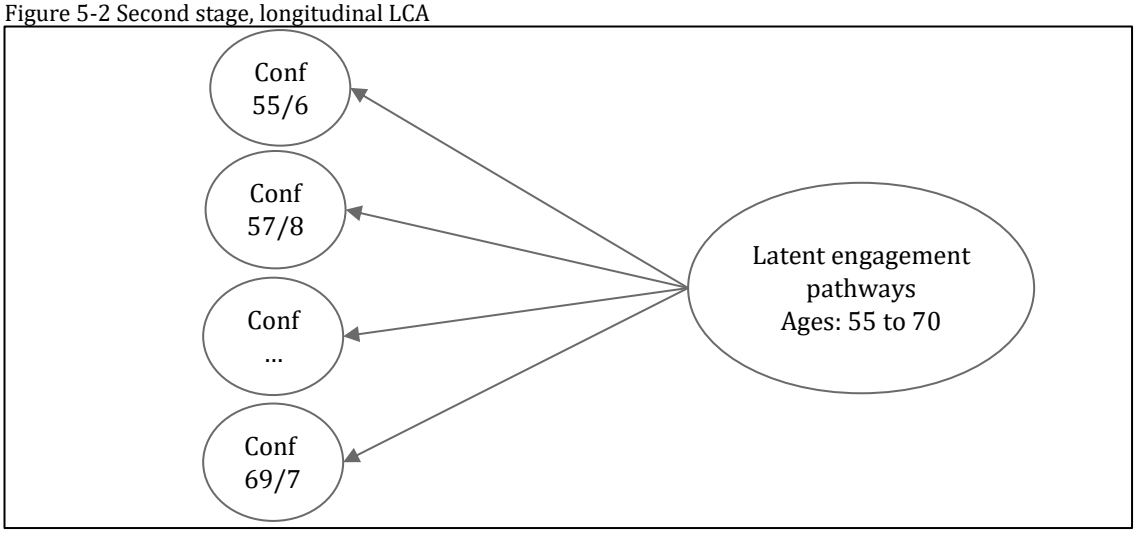
Notes: The first stage of the 2 stage LCA produces latent variables of engagement in paid and unremunerated work, for each age group. The categorical variables produced in this analysis, distinguish individuals who are combining their engagement in the multiple activities in a different way for each age group.

engagement at ages 55/56, 56/57… 69/70 (Figure 5-1). In the first stage LCA models, gender and cohort were used as covariates to better identify configurations

of engagement at each age, as done in previous research (Corna & Sacker 2013). It is important to account for cohort differences, i.e. decade of birth, in the analysis, since the two-staged LCA approach models engagement according to age.

The second stage consists of longitudinal LCA models that utilise the latent variables yielded in the first stage as its 'observed' variables to produce a variable that identifies the different paths of mid to later life engagement over time (see figure 5-2). Therefore, the second stage links the cross-sectional engagement configurations over time, in order to examine how engagement pathways in remunerated and unremunerated work activities unfold over time.

Figure 5-2 Second stage, longitudinal LCA



Notes: the second stage, uses the latent variables produced in the first stage, in order to discern paths of engagement in paid and unremunerated work over time, from the age of 55 to 70.

After the latent engagement paths were identified, multivariate analyses were used to investigate the demographic, socioeconomic, and health characteristics associated with each latent path of engagement in paid and unpaid activities. A multinomial logistic model, where the latent pathway variable was the nominal dependent variable, was used to explore how covariates relate to the engagement pathways. Multinomial logistic regression analysis models each level of a given nominal variable, comparing each category of the outcome variable to a reference one. In this case, the models show the odds of following a given engagement pathway rather than the reference one, according to demographic, socioeconomic and health variables (see tables 6-6 and 6-7). The probabilities of

being classified in one of the three mid to later life engagement pathways, identified by the two staged LCA (see section 6.4), are calculated as follows:

$$\Pr(y_{ij} = 1|x_i) = \frac{1}{1+\exp(\beta_1^{[2]}+\beta_2^{[2]}x_i)+exp(\beta_1^{[3]}+\beta_2^{[3]}x_i)}$$

$$\Pr(y_i = 2|x_i) = \frac{exp(\beta_1^{[2]}+\beta_2^{[2]}x_i)}{1+\exp(\beta_1^{[2]}+\beta_2^{[2]}x_i)+exp(\beta_1^{[3]}+\beta_2^{[3]}x_i)}$$

$$\Pr(y_i = 3|x_i) = \frac{exp(\beta_1^{[3]}+\beta_2^{[3]}x_i)}{1+\exp(\beta_1^{[2]}+\beta_2^{[2]}x_i)+exp(\beta_1^{[3]}+\beta_2^{[3]}x_i)}$$

Y_i indicates the outcome (the latent pathway variable) for a given individual *i*, and the superscript in the squared brackets, $\beta^{[n]}$, indicates the category of the dependent variable (each engagement pathway). The multinomial logistic model yields parameters only for the second and third categories, as these are compared to the base category. While in a binary logistic regression we would have had only a single intercept, β_1, and coefficient, β_2, for the multinomial logistic regression we have an intercept and a coefficient for two out of the three categories of the dependent variables, as one category becomes the reference category.

The two staged LCA and the multinomial regression were run using MPlus version 7 software, using full-information maximum likelihood (FIML) as the estimation procedure (Muthén & Muthén 2012). This method is convenient to deal with missing data as it allows the missing at random assumption (MAR), rather than the more restrictive missing completely at random (MCAR) assumption (Enders & Bandalos 2001; Graham 2009). Missing data are said to be MCAR when the missingness mechanism is independent from the respondents' characteristics, i.e. the missing observations can be considered a random sample of all observations (Graham 2009; Sterne *et al.* 2009). Listwise deletion may be an appropriate method to analyse the data in this case. Missing data are said to be MAR, when the missingness mechanism is dependent only on observed characteristics (Graham 2009; Sterne *et al.* 2009). In this case, missingness can be considered ignorable, after conditioning the statistical relationship of interest for observed variables that predict missingness. Missing data is non-ignorable when data are said to be missing not at random (MNAR), as missingness depends on observed and unobserved characteristics (Graham 2009; Sterne *et al.* 2009).

5.4.3 Assessment of model fit for latent class analysis

Since there is not a commonly accepted fit statistic to decide the optimal number of classes in a LCA model, a number of indices and theoretical considerations were used to decide the number of classes for each LCA model. The fit statistics and indices which were used to fit LCA models at both stages include: the Lo-Mendell Rubin likelihood ratio test (LMR-LRT), the Parametric Bootstrapped likelihood ratio test (BLRT), the Bayesian Information Criterion, the sample size adjusted Bayesian Information Criterion (SABIC), the Aikaike Information Criterion, and the entropy index. The LMR-LRT and the BLRT are two likelihood ratio tests that unlike the Chi-square difference likelihood ratio test, which is commonly used in structural equation modelling analyses, can be used for testing nested LCA models with different numbers of classes (Asparouhov & Muthén 2012; Lo *et al.* 2001; Nylund *et al.* 2007). Both the LMR-LRT and the BLRT, provide a p value which indicates whether a *k* number of class LCA model is preferred to a *k*-1 model (Nylund *et al.* 2007).

In addition, parsimony indices that penalise models according to the number of parameters and/or sample size were considered. The AIC is defined as

$$AIC = -2 \log(L) + 2p$$

where log(L) is the log likelihood and p is the number of free parameters in the model. The BIC takes into account sample size, and is defined as

$$BIC = -2 \log(L) + p \log(n)$$

where n is the sample size. The SABIC is derived from the BIC by replacing n with $n(n+2)/24$. These parsimony indices are designed in such a way that they favour models with higher likelihood values using the least number of parameters (Tein *et al.* 2013). A lower value for the parsimony indices indicates better model fit. In addition, scree plots can be used to decide when an index has plateaued. While the entropy index does not measure the fit of the models to the data, it provides an indication of the quality of the classification applied by LCA, by measuring classification uncertainty (Celeux & Soromenho 1996). Entropy values closer to one indicate better separation between classes. Although no clear cut-offs for entropy have been established, it has been suggested that entropy values above 0.80 could be considered highly discriminant (Tein *et al.* 2013).

Parsimony indices (AIC, BIC and SABIC) along with the model fit likelihood ratio tests and the entropy index were used to decide on the best fitting model. In

addition, class proportions, i.e. proportion of individuals assigned to each class, and conditional probabilities for each activity, are also examined when disagreement between indices and model fit tests occurred. For instance, class solutions where a class was particularly small (less than 5%) were generally avoided as a rule of thumb.

5.5 The relationship between paid work and engagement in volunteering and caregiving

This section describes the features of the regression models used to estimate the relationship between paid work and engagement in caregiving (chapter seven) and volunteering (chapter eight). WB-RE models, have been used to disentangle selection and direct effects, in order to gain an insight into the mechanisms that underlie the relationships. The WB-RE model has various advantages over the commonly used random effects and fixed effects models, as it possesses the advantages of both approaches, as explained below.

In the following subsection (5.5.1), fixed effects (FE) and the random effects (RE) models are outlined. These two types of models, which have been used extensively in applied longitudinal analysis, can yield different results as they utilise the within and between person variability inherent in panel data, differently. FE models net-out the differences between individuals, thus focusing exclusively on within person variability among those individuals who change in regard to the dependent variable; in contrast, RE models, use a combination of within and between person variability. Both models have advantages and disadvantages (see section 5.5.1). In subsection 5.5.2, the WB-RE model, is outlined, which has been argued to have the benefits of both the RE and FE models, avoiding their main pitfalls (Bell *et al.* 2016; Bell & Jones 2015b; Dieleman & Templin 2016).

5.5.1 Fixed and Random effects models

Specific longitudinal methods are required to analyse repeated observations data, as other traditional estimation procedure, such as standard linear, logistic or probit regression are otherwise prone to yield inefficient and inconsistent estimates. One of the main assumptions for ordinary least squares (OLS) linear regression, and equivalent categorical models (logistic and probit models), is that each individual observation is independent of each other, i.e. each observation

should come from a simple random sample from a single defined population. However, this is evidently not the case when analysing repeated-measures data, where observations are nested within individuals, i.e. longitudinal data can be considered a hierarchical type of data. In longitudinal datasets, there are two different sources of heterogeneity that need to be considered separately: variation between individuals, and variation within each individual over time. This is one of the main advantages of longitudinal modelling, as it is possible to break down the residual error component of the common OLS regression equation (ε_{it}), into time-invariant individual heterogeneity (u_i), and idiosyncratic error (e_{it}). In a longitudinal relationship, for each outcome y at time t for any individual i, this would be formulated as:

$$y_{it} = E(y_{it}) = \beta_0 + \sum_{j=1}^{J} \beta_{jit} x_{jit} + \sum_{k=1}^{K} \beta_{ki} x_{ki} + u_i + e_{it} \qquad (1)$$

where β_0 is the intercept, β_{jit} is the coefficient for time-dependent predictor variables j, x_{jit} are time-dependent predictor variables, β_{ki} is the coefficient for time-independent predictor variables j, x_{ki} are time-independent predictor variable, u_i is the time-invariant individual error and e_{it} is the residual error. Given that the repeated measures are nested within individuals the residual error is split into two components in this equation: u_i is an individual specific error term that is constant over time t; e_{it} is the residual random error that vary across individuals i and times t, and includes measurement error.

RE and FE models, commonly used in longitudinal data analysis, treat the within individual heterogeneity u_i differently. While RE models exploit both the within and between subject variation, the FE models instead exclusively utilise the within variation, discounting the between subject variation. These two models have different assumptions and interpretations, as they deal with the longitudinal nature of the data differently (Bell *et al.* 2016). Furthermore, different academic disciplines have historically preferred one approach or the other, as FE models are generally the preferred choice in economics and political science, while RE models are more often used in epidemiology, biomedical sciences and sociology (Bell & Jones 2015b).

RE models exploit the full information provided by longitudinal data, while accounting for the dependency of repeated measures within individuals (Laird & Ware 1982). As mentioned in regard to the above formula (1), RE models split the residual error into the two components, $\varepsilon_{it}=u_i+e_{it}$, treating the individual specific

residuals, u_i, as a normally distributed random variable. The model can be formalised as follows:

$$y_{ij} = \beta_0 + \sum_{j=1}^{J} \beta_{jit} x_{jit} + \sum_{k=1}^{K} \beta_{kit} x_{kit} + \varepsilon_{it} \quad (2)$$

$$\varepsilon_{it} = u_i + e_{it} \quad (3)$$

In equation 2, β_0, β_{jit} through to β_{kit} represent the fixed effects parameters that are estimated in the model; x_{jit} and x_{kit} represent the independent variables that are included in the model; and ε_{it} represent the residual error of the estimate. The residual error is split into two components: u_i is the component of the error that is constant over time; e_{it} is instead the subject and time specific error component that varies across individuals *i* and waves *t*. The random effect u_i, which gives the name to the technique, is therefore estimated, as one of the stochastic components of the model. As the error term is separated into two components, RE models are also referred to as error or variance components model. However, one of the main assumptions of this model is that the individual specific unobserved heterogeneity, u_i, is uncorrelated with the independent variables x_{it}, i.e. independent variables are exogenous. If this assumption is violated, estimates may be biased, making RE models inconsistent. For this reason, endogeneity of the independent variables is particularly an issue for RE models.

Another shortfall of RE models is also that they may act as a "black box", where it is not clear how to interpret the effect of an independent variable on an outcome. As RE models combine the within and between variability to produce a unique estimate for each variable, it is not immediately evident when inspecting each estimate whether the between or within subject variability weighed more in the estimation. This may make interpretation of effects uncertain.

In the presence of endogeneity, estimates from FE models are often preferred to RE models. The "within-subject" estimates produced by FE models exploit the longitudinal nature of the data to control for time invariant characteristics that vary across individuals (e.g. gender, personality traits) (Hsiao 2007; Wooldridge 2010). By utilising only within subject variability, i.e. changes in dependent and independent variables within individuals, FE models produce estimates that control for individual heterogeneity. FE models have the advantage that they estimate

purely within subject effects, thus providing additional insight on the causal association. The FE model can be formulated as follow:

$$y_{it} - \overline{y}_i = \sum_{j=1}^{J} \beta_j \left(x_{jit} - \overline{x}_{ji}\right) + \sum_{k=1}^{K} \beta_k (x_{ki} - \overline{x}_{ki}) + (e_{it} - \overline{e}_i) + (u_i - \overline{u}_i) \qquad (4)$$

$$\ddot{y}_{it} = \sum_{j=1}^{J} \ddot{x}_{jit} + \ddot{e}_{it} \qquad (5)$$

where $\bar{y}$ and $\bar{x}$ are the mean of the dependent and independent variables for each individual, while $\ddot{y}$ and $\ddot{x}$ are the demeaned values of the dependent and independent variables (see equation 1 for the rest of the nomenclature). Fundamentally, in equation (4) dependent and independent variables have been centred around their within-subject means by netting out time invariant characteristics. What is left in equation (5), are the demeaned values of any term, that is any term which is time dependent, i.e. varies over time, while time independent variables, and unobserved heterogeneity due to time constant subject specific characteristics, are removed from the model. It could be said that the individual heterogeneity u_i is fixed for each individual over time, as this method is analogous to least squares dummy variable estimation (LDSV), where a dummy variable for each individual unit is added. For this reason, this type of estimation is referred to as fixed effect.

The advantage of FE modelling is that it helps to deal with the problem of selection. For example, individuals who provide care may differ from those who do not, according to subject specific characteristics, as providing informal care is likely to be related to unobserved characteristics, such as personality traits. Consequently, FE estimation allows us to partial out time-invariant characteristics that might otherwise confound the analysis, dealing with endogeneity (Hsiao 2007; Wooldridge 2010). But while FE models may be more consistent compared to RE models, they are also more inefficient as they have the disadvantage of not estimating the effect of time invariant variables, thereby discarding information regarding between-subject differences (Bell & Jones 2015b). This information on individuals is likely to be of interest. For example, if we want to understand how the effect of employment status changes across sociodemographic groups, we might be interested in including education in the models. However, as education at older ages

is mostly a time-invariant variable, it cannot be considered in FE models. Furthermore, it is not possible to make adequate inferences about between subject differences even when these are time variant (Bell & Jones 2015b).

5.5.2 Within-between random effects models: the best of both worlds

A proposed solution to the shortfalls of the RE and FE models, is the "within-between" estimator, also known as hybrid model (Bell & Jones 2015b). This approach, developed from the initial formulation proposed by Mundlak (1978), has the advantage of both the RE an FE models, while avoiding their shortfalls (Bell & Jones 2015b). This type of model separates the within and between components of time varying variables estimates into two coefficients. For an outcome *y* at time *t* for any individual *i*, this would be formulated as:

$$y_{it} = \beta_0 + \sum_{j=1}^{J} \beta_{j1}\left(x_{jit} - \overline{x}_{ji}\right) + \sum_{j=1}^{J} \beta_{j2}\overline{x}_{ji} + \sum_{k=1}^{K} \beta_k\, x_{ki} + e_{it} + u_i \qquad (6)$$

where β_{j1} is the coefficient for the subject specific effect of the demeaned time-dependent variables $\left(x_{jit} - \overline{x}_{ji}\right)$, and β_{j2} is the coefficient for the contextual effect of the means of the time-dependent variables $\overline{x}_{ji}$. As this model is performed through the normal estimation of an RE model, it is also possible to estimate the effects of time-independent variables ($\beta_k x_{ki}$).

The main advantage of within-between models is that they provide estimates that can be more easily interpreted. Within-between models enable the examination of both the "contextual" effect of a given time varying variable, as well as the within-subject effect as shown in in FE models. In this case, it would be possible to examine both the effect of employment status on engagement in unremunerated forms of work that are due to differences between individuals who work and do not work (e.g. personal characteristics, previous wok history, selection effects), and that which is due to within-subject variability, i.e. the effect of individuals changing their employment status over time.

While the within-subject estimate is much more useful in learning about the causal link between employment status in mid to later life and engagement in unremunerated work activities, it is important to examine also the contextual effects that may influence selection effects or fixed personal characteristics, as these are relevant for policies that extend working lives. Even if evidence of a direct

relationship is not found, i.e. the within-subject estimates show no effect of employment status on engagement in unpaid work, a significant relationship with respect to between-subject estimates may have strong implications for the feasibility of promoting engagement in paid and unpaid work in later life.

Another advantage of using the WB-RE model is that it is a more robust method when dealing with unbalanced panels and missing data that result from attrition, which is common in longitudinal research. The WB-RE works within the framework of RE models, which allows the MAR assumption, i.e. the likelihood of missingness is not dependent on missing observations after accounting for the relationships with observed variables (Carrière & Bouyer 2002; Hu *et al.* 1998; Laird 1988).

Statistical analyses were done using STATA version 15 (StataCorp 2017). WB-RE models were implemented with the *xthybrid* command (Schunck & Perales 2017). This user-written suite of command allows the estimation of WB-RE models, using also link functions (e.g. logit and probit). Binary logistic models were used to estimate the probability of caregiving and volunteering. Ordinal logistic models would have been used, but the proportional odds assumption was rejected.

Unweighted results were presented given that the *xthybrid* command does not support the use of weights. Sensitivity analyses presented in appendices A (tables A3 and A4) and B (tables B3 and B4), compare weighted and unweighted estimates produced with multilevel models. Meaned and demeaned variables were entered manually in the multilevel model, in order to obtain within and between person estimates. For this reason, the unweighted estimates in the appendices are marginally different from the corresponding estimates in chapters 7 (tables 7-2 and7-3) and 8 (table 8-2 and 8-3). The sensitivity analyses show that weighted estimates, which adjust for individual and household attrition, are not qualitatively different from unweighted estimates.

5.6 Conclusion

This chapter described the datasets, the variables, and the analytic approach used in the following empirical chapters. The following three chapters present the results of the research. Chapter six shows the pathways of engagement in paid and unpaid activities in mid to later life. A person-centred approach is used in order to uncover distinct pathways of engagement from ages 55 to 70. Age ordered data from

the BHPS (waves: 6, 8, 10, 2, 14, 16, 18) is used in chapter six, as the survey question on civic participation was only asked in the BHPS, not in the UKHLS, and the question on volunteering was only asked at every other wave, starting at wave 6, and waves 2, 4 and 6 of the UKHLS.

Chapter seven evaluates the longitudinal relationship between paid work and engagement in caregiving, using the WB-RE model, which permits to disentangle within and between person estimates. This allows a better understanding of selection and causal processes. Every available wave from the BHPS (waves 1 to 18) and UKHLS (waves 2 to 7) was used for this analysis. Chapter eight uses the same approach as chapter seven, to examine the longitudinal relationship between paid work and engagement in caregiving, using WB-RE models. Both data from the BHPS (waves: 6, 8, 10, 2, 14, 16, 18) and the UKHLS (2, 4, 6) are used in chapter eight. However, some of the waves of the studies cannot be used, given that the question for volunteering was asked only at every other wave.

Chapter 6

Pathways of engagement in paid and unpaid work in mid to later life: two-staged latent class analysis

6.1 Introduction

This chapter examines individuals' engagement in paid work, informal care provision, volunteering, civic participation, and involvement in housework from ages 55 to 70. A two-stage LCA approach is used to show how individuals combine these activities over time, providing a nuanced picture of individuals' engagement in multiple activities, rather than merely investigating whether pairs of activities are competing or complementary. Furthermore, the analysis examines how engagement in paid and unpaid work is related to sociodemographic and health characteristics in order to gain insights into inequalities in engagement in later life.

This study extends previous literature by taking a longitudinal and lifecourse approach to the study of engagement in paid and unpaid work in mid to later life, examining how this is related to health, gender and socioeconomic inequalities. The lifecourse perspective emphasises the interaction between states, transitions and trajectories to understand how chronological age, institutional contexts, social change and relationships to others shape individual experiences and life cycle transitions (Alwin 2012; Elder 1992). Despite ample evidence showing the relevance of a lifecourse perspective to understand health and socioeconomic outcomes in later life (e.g. Bartley et al. 1997; Blane et al. 2004; Burton-Jeangros et al. 2015; Corna & Sacker 2013; Kahn & Fazio 2005; Ploubidis et al. 2014), there is a lack of research utilising this approach to study engagement in paid and unpaid work in later life. Using the lifecourse perspective, focusing on the interdependent transitions and trajectories in paid and unpaid work in mid to later life, may shed a light on the presence and the mechanisms behind gender, socioeconomic and health inequalities in engagement in unpaid activities in later life.

The objective of this chapter is to examine patterns of engagement in paid work and unpaid activities (paid work, informal care provision, volunteering, civic participation, and housework) in mid to later life using data from the BHPS. Furthermore, how engagement patterns are associated with sociodemographic characteristics (gender, cohort, marital status, education, housing tenure, income, and subjective financial status) and health is examined. This work extends previous research by incorporating a longitudinal approach, two-staged LCA, which can be used to describe typologies of engagement as people age. This approach facilitates modelling interdependent phenomena and their age graded change over time (Corna & Sacker 2013; MacMillan & Copher 2005; Macmillan & Eliason 2003).

Through this technique longitudinal patterns of engagement in paid work, informal care provision, volunteering, civic participation, and housework from ages 55 to 70 are examined. The specific research questions addressed in this chapter are as follows:

1. How do individuals combine engagement in multiple paid and unpaid activities (paid work, informal care provision, volunteering, civic participation, and housework) over time, from mid to later life? (section 6.3)
2. How do pathways of engagement relate to gender, socioeconomic and health inequalities? (section 6.4)

Overall, the findings presented in this chapter identify three distinct engagement pathways: *paid workers*, *mixed activities (housework)* and *mixed activities (volunteers)*. *Paid workers* (43% of the sample) are relatively more likely to work full-time and less likely to engage in unpaid activities. Individuals who follow the other two pathways are more likely to combine remunerated and unpaid activities. The latent variable that classifies individuals into one of the three engagement pathways is associated to sociodemographic and health characteristics. Gender differences are conspicuous, as women are substantially more likely to be classified in the *mixed activities (housework)* and *mixed activities (volunteers)*. Therefore, women are more likely to combine engagement in paid and unpaid forms of work.

The following section (6.2), presents descriptive statistics on the prevalence of engagement in paid work, informal care provision, volunteering, civic participation, and housework at each age. Section 6.3 shows the results from the first stage of the two-staged LCA. Results provide an indication of individuals' engagement at each age from ages 55 to 70, and discuss how the most appropriate latent class models were chosen. In section 6.3, the results of the second stage are presented. The results provide a graphical depiction of the pathways of engagement in mid-to later life. In section 6.4, the latent variable describing the membership in each pathway is used in regression models in order to gain insights into social and health inequalities in engagement in mid to later life. Finally, section 6.5 provides a conclusion that summarises the findings.

6.2 Descriptive statistics: engagement in paid and unpaid activities from ages 55 to 70

A total of 5,860 individuals were included in the sample for the two staged LCA. The longitudinal data was re-arranged by age rather than by wave for the two staged LCA. This is an "accelerated longitudinal design" approach, meaning that multiple cohorts of individuals born at different ages are analysed as a single cohort, by re-ordering the longitudinal data by age rather than by wave (Galbraith *et al.* 2017). This approach allows the analysis of developmental age-related changes; in this case, how engagement in multiple paid and unpaid activities changes in the years preceding and following the SPA. While an accelerated longitudinal design analysis is generally less affected by drop-out, by design most of the individuals in the analysis do not provide information for the full length of the period of interest, i.e. ages 55 to 70 (Galbraith *et al.* 2017). This can be observed in table 6-1, as the total sample at each age ranges from 1,839 to 2,589. This is lower than the total

Table 6-1 Percentages of engagement in paid and unpaid activities by age

	Percentage (%) by age							
	55-56	57-58	59-60	61-62	63-64	65-66	67-68	69-70
Paid work								
Out of paid work	28.7	35	41.4	55.4	65.5	78.1	87.5	90.8
Part-time	8.3	9.7	9.8	9	7.2	6.3	5.8	4.7
Full-time	62.9	55.2	48.7	35.6	27.3	15.7	6.7	4.5
Caregiving								
No	73.4	73.4	74	73.9	75.9	77.8	78	78
Yes	26.6	26.6	26	26.1	24.1	22.2	22	22
Volunteering								
No	86.9	87.2	86.2	84.6	83.4	82.7	81.2	81.4
Yes	13.1	12.8	13.8	15.4	16.6	17.3	18.8	18.6
Civic participation								
No	83.9	83.5	81.6	81.3	79.8	79	77.2	77.3
Yes	16.1	16.5	18.4	18.7	20.2	21	22.8	22.7
Housework								
≤10 hpw	57	57.7	57	55.5	55.6	53.4	53.7	54.2
11 to 20 hpw	28.2	26.7	27.9	27.6	26.2	27.7	29.2	28.4
>20 hpw	14.7	15.6	15.1	17	18.2	18.9	17.1	17.4
Total (n)	2573	2589	2496	2334	2137	2035	1920	1839

Notes: percentage of respondents participating in each form of paid and unpaid work by age. hpw: hours per week
Source: BHPS (waves: 6, 8, 10, 12, 14, 16, and 18). Author's own calculations.

of 5,860 given that some of the participants may have joined the study when they were already older than 55, or left the study before age 70.

Table 6-1 shows the percentage of individuals that participates in paid work, informal care provision, volunteering, civic participation, and housework at each age. Age is categorised in two-year age groups as data on volunteering and civic participation was collected only at every other wave in the BHPS. The prevalence of individuals participating to full-time paid work drops substantially, declining from

63% at age 55-56 to 4.5% at age 69-70. The decline of the prevalence of individuals in part-time paid work is delayed compared to full-time work, as it starts decreasing only after age 59-60, dropping from 10% to 5% at age 69-70. The prevalence of people reporting that they provide any informal care remains broadly constant until age 61-62, when it drops from 26% to 22% by age 69-70. There is a small increase in the percentage of individuals reporting that they engage in volunteering and civic participation on a monthly basis. A clear age trend cannot be observed for housework, although it seems that the prevalence of providing 10 or fewer hours of housework per week decreases while the prevalence of providing 20 or more hours increases from ages 59-60 to 65-66.

6.3 First stage LCA: engagement configurations at 2 years' age intervals

In the first stage of the two-staged latent class analysis, cross-sectional LCA models were applied at each age. This process produces latent variables that categorise individuals' engagement at ages 55-56, 57-58, …, 69-70. These latent categorical indicators were then used in a longitudinal LCA model in the second stage. While this step does not provide information that answers the research objectives, the data reduction process described herein was necessary to produce the longitudinal pathways of engagement described below (section 6.4).

The analyses included 5,860 men (46%) and women (54%). In the first stage of the analysis, patterns of engagement in paid work, informal caregiving, volunteering, civic participation, and housework at each age were assessed through LCA models. This process yields latent variables defining configurations of engagement at each age. Table 6-2 presents the model fit indices and the selected LCA model for each age (highlighted in bold). Parsimony indices (AIC, BIC and SABIC) along with the model fit likelihood ratio tests and the entropy index were used to decide on the best fitting model. In addition, class proportions, i.e. proportion of individuals assigned to each class (Table 6-2), and conditional probabilities for each activity were examined when disagreement between indices and model fit tests occurred. As a rule of thumb, class solutions where a class was particularly small (less than 5%), were generally avoided.

In Table 6-2, the LCA models selected as the best-fitting LCA models are shown in bold. For example, the four class solution was selected at age 55/56, as the

LMR-LRT and the BLRT were both strongly significant, and the AIC, BIC and SABIC parsimony indices were considerably lower than in the three class solution. Furthermore, this class solution had a high entropy index (0.8). At age 57/58 the 3 class solution was preferred, as the parsimony indices favoured this configuration

Table 6-2 Assessment of model fit for the 1st stage LCA.

Age	N	Latent class solution	AIC	BIC	SABIC	LMR-LRT	BLRT	Entropy	Class proportions (%)
55-56	2573								
		2	15325	15425	15371	<0.0001	<0.0001	0.70	54;46
		3	14881	15039	14953	<0.0001	<0.0001	0.80	42; 9; 49
		4	**14758**	**14975**	**14857**	**<0.0001**	**<0.0001**	**0.80**	**7;40;6;47**
		5	14717	14992	14843	<0.0001	<0.0001	0.76	7;18;21;47;6
57-58	2589								
		2	15721	15820	15766	<0.0001	<0.0001	0.68	53; 47
		3	**15292**	**15450**	**15365**	**<0.0001**	**<0.0001**	**0.79**	**43; 48;8**
		4	15212	15429	15311	<0.0001	<0.0001	0.83	41;6;49;4
		5	15160	15435	15286	0.0276	<0.0001	0.75	5; 5; 49; 21; 21
59-60	2496								
		2	15416	15515	15461	<0.0001	<0.0001	0.67	48;52
		3	**14955**	**15112**	**15026**	**<0.0001**	**<0.0001**	**0.76**	**47;10;44**
		4	14840	15056	14938	0.0094	<0.0001	0.74	5;42;40;12
		5	14799	15073	14924	0.0623	<0.0001	0.77	29; 7; 18; 37; 9
61-62	2334								
		2	14270	14368	14314	<0.0001	<0.0001	0.72	52;48
		3	13879	14034	13948	<0.0001	<0.0001	0.79	12;43;44
		4	**13787**	**14000**	**13883**	**<0.0001**	**<0.0001**	**0.79**	**6;43;9;43**
		5	13759	14029	13880	0.0866	<0.0001	0.79	8;9;38;6;38
63-64	2137								
		2	12812	12908	12854	<0.0001	<0.0001	0.69	44;56
		3	12509	12662	12576	<0.0001	<0.0001	0.740	11; 39; 50
		4	**12444**	**12654**	**12537**	**<0.0001**	**<0.0001**	**0.77**	**7;12;46;35**
		5	12435	12701	12552	0.2117	<0.0001	0.71	12;20;34;28;6
65-66	2035								
		2	11823	11919	11865	<0.0001	<0.0001	0.67	46;54
		3	**11507**	**11659**	**11573**	**<0.0001**	**<0.0001**	**0.75**	**47;11;42**
		4	11452	11660	11543	0.0342	<0.0001	0.71	16;35;7;42
		5	11448	11712	11563	0.113	0.0667	0.73	7; 29; 2; 15; 47
67-68	1920								
		2	10717	10811	10757	<0.0001	<0.0001	0.60	47; 53
		3	10391	10541	10455	<0.0001	<0.0001	0.775	12; 35; 53
		4	**10354**	**10559**	**10442**	**0.0272**	**<0.0001**	**0.72**	**11;48;34;7**
		5	10346	10607	10458	0.1241	<0.0001	0.67	34;11;41;4;11
69-70	1839								
		2	9925	10019	9965	<0.0001	<0.0001	0.64	45;55
		3	9650	9799	9713	<0.0001	<0.0001	0.70	49;13;38
		4	9605	9809	9691	<0.0001	<0.0001	0.78	7; 37;11;45
		5	**9584**	**9843**	**9694**	**0.0141**	**<0.0001**	**0.83**	**36; 11; 4; 13; 36**

Notes: latent engagement configurations in paid and unpaid activities at 2-year age intervals. Gender and birth cohort are included as covariates in these first-stage LCA models.
Source: BHPS (waves: 6, 8, 10, 12, 14, 16, and 18). Author's own calculations.

compared to the four class one. Furthermore, model interpretation of the conditional probabilities, suggested that the addition of a fourth class would add little to our understanding of engagement in paid and unpaid work. In fact, the 4 class solution is composed of a group smaller than 5% of the sample at that age. Similar decision making was used to select the appropriate LCA models also at the following ages. At all ages except, age 69-70, the 3 or 4 class models solution were preferred. At age 69-70, the 5 class model solution was chosen, given that the LMR-LT and the BLRT are significant and the entropy is higher than in the other LCA models at that age. Inspection of the conditional class probabilities suggested that the addition of a fifth class would better describe the engagement in paid and unpaid activities at age 69-70.

The changing number of classes at each age may reflect the variation in engagement in the paid and unpaid activities at each age (Macmillan & Eliason 2003). The conditional probabilities shown in tables 6-3 and 6-4 need to be examined in order to acquire a qualitative understanding of the selected LCA models. The conditional probabilities designate the likelihood of engaging in each paid and unpaid form of work. For example at age 55-56 (table 6.3), the first class (7% of the sample) is composed by individuals with a relatively high likelihood of engaging in full-time paid work (0.76), volunteering (0.91) and civic participation (0.71). Those in the second class (40%), have a moderate probability of engaging in paid work (full-time: 0.46; part-time: 0.14), and a higher probability of spending more hours per week doing housework (11-20 hours per week: 0.51; more than 20 hours: 0.3). Those in the third class (6%) have a low probability of engaging in full-time paid work (0.28) and a high likelihood of engaging in all other unpaid activities. Those in the fourth class (47%) have the highest probability of working full-time (0.82) and the lowest probability of engaging in all other unpaid activities, compared to the other classes at age 55-56.

Other configurations of engagement at ages 57-58, 59-60 and 61-62 are approximately similar: two larger classes representing over 40% of the sample each, and one or two smaller classes. The two larger classes denote a group of individuals who are predominantly more likely to engage in full-time paid work, and a group who are relatively less likely to engage in full-time paid work and more likely to spend more hours per week on housework. The former class of workers closely resembles the “working” group identified in the ACL study (Morrow-Howell *et al.*

2014). One of the smaller classes (class 1 at age 55-56; class 3 at 57-58; class 2 at 58-60; class 1 at 61-62) represents a group of individuals who generally have a moderate probability of engaging in full-time paid work and high probability of

Table 6-3 Conditional probabilities for the latent configurations of engagement at each age (55-62)

Conditional probabilities by age and latent class														
	55-56				57-58			59-60			61-62			
	1	2	3	4	1	2	3	1	2	3	1	2	3	4
Paid work														
No	0.20	0.40	0.53	0.16	0.48	0.23	0.40	0.55	0.39	0.27	0.46	0.38	0.76	0.70
PT	0.04	0.14	0.19	0.02	0.16	0.05	0.07	0.14	0.15	0.04	0.12	0.03	0.14	0.13
FT	0.76	0.46	0.28	0.82	0.36	0.72	0.53	0.31	0.46	0.69	0.42	0.59	0.10	0.17
Caregiving														
No	0.65	0.69	0.54	0.82	0.66	0.82	0.62	0.70	0.62	0.82	0.66	0.83	0.54	0.72
Yes	0.35	0.32	0.46	0.18	0.34	0.18	0.38	0.30	0.38	0.18	0.34	0.18	0.46	0.28
Volunteering														
No	0.09	1.00	0.19	1.00	0.94	0.95	0.00	0.95	0.04	0.96	0.16	1.00	0.11	1.00
Yes	0.91	0.00	0.82	0.00	0.06	0.05	1.00	0.05	0.97	0.04	0.84	0.00	0.89	0.00
Civic part.														
No	0.29	0.93	0.34	0.94	0.89	0.92	0.00	0.90	0.06	0.91	0.39	0.94	0.31	0.89
Yes	0.71	0.08	0.66	0.07	0.11	0.08	1.00	0.10	0.94	0.09	0.61	0.06	0.69	0.11
Housework														
≤10 hpw	0.84	0.18	0.07	0.95	0.17	0.93	0.64	0.24	0.56	0.95	0.89	0.90	0.23	0.23
11 to 20	0.16	0.51	0.57	0.05	0.50	0.07	0.20	0.48	0.29	0.05	0.11	0.10	0.46	0.44
≤10 hpw	0.00	0.30	0.37	0.00	0.33	0.00	0.16	0.28	0.16	0.00	0.00	0.00	0.31	0.34
Total (n)	180	1034	153	1206	1126	1246	217	1170	240	1086	143	993	206	992
Total (%)	7	40	6	47	43	48	8	48	10	44	6	43	9	43

Notes: the table shows the probability of for each category of the variables conditional on the class membership, at each age. PT: part-time; FT: full-time;
Source: BHPS (waves: 6, 8, 10, 12, 14, 16, and 18). Author's own calculations.

Table 6-4 Conditional probabilities for the latent configurations of engagement at each age (63-70)

Conditional probabilities by age and latent class																
	63-64				65-66			67-68				69-70				
	1	2	3	4	1	2	3	1	2	3	4	1	2	3	4	5
Paid work																
No	0.83	0.56	0.81	0.47	0.89	0.76	0.67	0.92	0.84	0.93	0.78	0.85	0.85	0.95	0.99	0.94
PT	0.12	0.09	0.09	0.03	0.07	0.12	0.05	0.08	0.06	0.04	0.10	0.05	0.08	0.05	0.01	0.05
FT	0.05	0.35	0.10	0.50	0.04	0.12	0.28	0.00	0.10	0.04	0.13	0.09	0.06	0.00	0.00	0.01
Caregiving																
No	0.64	0.72	0.73	0.85	0.74	0.67	0.84	0.66	0.87	0.74	0.68	0.87	0.76	0.64	0.00	1.00
Yes	0.36	0.29	0.28	0.15	0.26	0.33	0.16	0.35	0.13	0.26	0.32	0.13	0.24	0.36	1.00	0.00
Volunteer.																
No	0.00	0.41	1.00	0.98	0.90	0.00	0.96	0.06	1.00	0.95	0.39	1.00	0.00	0.15	0.87	0.94
Yes	1.00	0.59	0.00	0.03	0.10	1.00	0.04	0.94	0.00	0.05	0.61	0.00	1.00	0.85	0.13	0.06
Civic part.																
No	0.42	0.28	0.87	0.99	0.84	0.11	0.91	0.21	0.92	0.85	0.51	0.91	0.36	0.00	0.87	0.84
Yes	0.58	0.72	0.13	0.01	0.16	0.89	0.09	0.79	0.08	0.15	0.49	0.09	0.64	1.00	0.13	0.16
Housework																
≤10 hpw	0.11	0.94	0.21	0.93	0.20	0.54	0.86	0.32	0.87	0.07	1.00	0.86	0.88	0.16	0.22	0.30
11 to 20	0.54	0.06	0.43	0.07	0.42	0.31	0.13	0.50	0.13	0.51	0.00	0.14	0.12	0.52	0.41	0.40
≤10 hpw	0.35	0.00	0.36	0.00	0.38	0.15	0.01	0.19	0.00	0.42	0.00	0.00	0.00	0.32	0.38	0.31
Total (n)	151	253	989	744	956	223	856	220	918	648	134	665	196	82	235	661
Total (%)	7	12	46	35	47	11	42	11	48	34	7	36	11	4	13	36

Notes: the table shows the probability of for each category of the variables conditional on the class membership, at each age.
PT: part-time; FT: full-time;
Source: BHPS (waves: 6, 8, 10, 12, 14, 16, and 18). Author's own calculations.

engaging in volunteering and civic participation. This group closely resembles the "workers/volunteers" group identified by Burr et al (2007). A second smaller class (class 3 at ages 55-56 and 62-62) identifies individuals with a low probability of engaging in paid work and a high probability of engaging in unpaid activities, in particular informal caregiving. This group resembles the "super-helpers", "high

activity" and the "family-helpers" groups identified in the studies by Burr et al, Morrow-Howell et al, and Mergenthaler et al, respectively (Burr *et al.* 2007; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014).

The configurations of engagement identified from age 63-64 to 69-70 (table 6-4), are somewhat different from those at ages 55-56 to 61-62 (table 6-3). In particular, the group of paid workers seems to shift into a "low activity" group with a low probability of engaging in both paid and unpaid activities (class 3 at age 65-66; class 2 at 67-68; class 1 at 69-70). However, the results presented in tables 6-3 and 6-4 represent individual snapshots of configurations of engagement at each age, rather than longitudinal patterns. It can only be speculated whether configurations at different ages can be connected, i.e. whether they are formed by the same group of people. In the following section, the results from the second stage LCA allow the identification of longitudinal engagement pathways, in order to examine how interdependent trajectories of engagement in paid and unpaid work change over time.

6.4 Second stage LCA: mid to later life engagement pathways

The chosen latent engagement configurations from the first stage were used in the second stage longitudinal LCA to produce latent mid to later life engagement pathways. Table 6-5 presents the indices, model fit tests, and class proportions for each model. The preferred solution was the three-class model. The three-class model was chosen despite the LMR-LRT not being significant, as the AIC, BIC and SABIC indicated that the three-class solution had a substantially better model fit

Table 6-5 Assessment of model fit for 2the second stage LCA

Classes	AIC	BIC	SABIC	LMR-LRT	BLRT	Entropy	Class proportions (%)	N
2	30690	30990	30847	<0.0001	<0.0001	0.84	52;48	5860
3	**29041**	**29495**	**29279**	**0.8167**	**<0.0001**	**0.82**	**46;43;11**	**5860**
4	28482	29090	28800	0.8403	<0.0001	0.80	7;9;41;43	5860
5	28296	29057	28694	0.7622	<0.0001	0.72	7;10;12;35;36	5860

Notes: model fit for the latent engagement pathways.
Source: BHPS (waves: 6, 8, 10, 12, 14, 16, and 18). Author's own calculations.

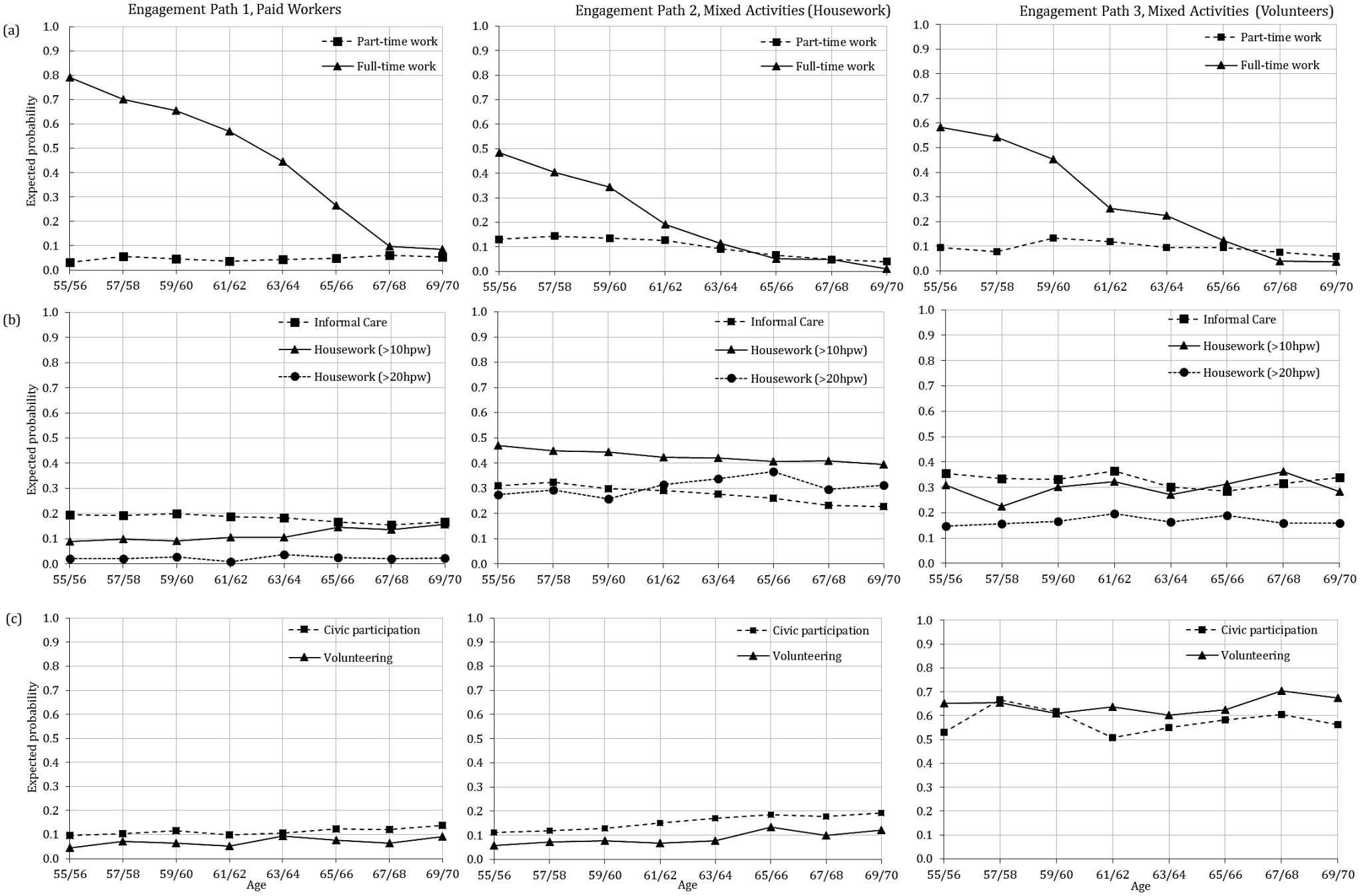
than the two class and the four class solutions. The four-class solution had AIC, BIC and SABIC values which were only marginally lower - in a scree plot these indices plateaued after the three class solution. The high entropy index (0.82) indicated that the LCA model had successfully distinguished different latent classes.

By multiplying and then summing the conditional probability from the first stage LCA with the ones from each class of the second stage analysis, age graded expected probabilities for each latent pathway were obtained (Corna & Sacker 2013; MacMillan & Copher 2005; Macmillan & Eliason 2003). The plotted expected probabilities are shown in figure 6-1. These show the three mid to later life pathways of engagement. The top panel (a) shows the probability of engaging in paid work. The mid panel (b) shows the probability of engaging in caregiving and housework. The bottom panel (c) shows the probability of engaging in volunteering and civic participation (figure 6-1).

The three engagement pathways are referred to as: *paid workers*, *mixed activities (housework)*, *mixed activities (volunteers)*. The *paid workers* pathway, which describes the experience of 43% (n=2,528) of the sample, is characterised by a higher probability of engaging in full-time paid work and lower probability of engaging in all other unpaid activities relative to the other two pathways (Figure 6-1, left-hand column). This pathway is mostly composed by men (90%). *Paid workers* have a higher probability of working full-time in comparison to the other two engagement pathways (Fig. 6-1a), while simultaneously having a low probability of participating in unpaid activities, i.e. caregiving, housework, volunteering and civic participation (6-1b and 6-1c). The probability of participating in the paid labour market declines steadily after the age of 60, and dips below 0.3 by age 65/66. The probability of engaging in any unpaid activity for this group is low, as it stays below probability 0.2, between ages 55 to 70. Compared to the other two engagement pathways, the probability of participating to full-time paid work is higher at each age and remains higher for longer, i.e. individuals in this group are more likely to work for longer.

The second pathway, *mixed activities (housework),* describes the experience of 46% of the sample (Figure 6-1, middle column). This pathway, which is overwhelmingly composed of women (93%), captures the experience of individuals who have a lower probability of engaging in full-time paid work and higher probability of engaging in caregiving and spend more hours doing *housework* compared to the *paid workers* pathway. The probability of participating in full-time

Figure 6-1 Mid to later life engagement pathways (paid work, informal care provision, housework, volunteering and civic engagement (N=5860).



paid work is lower at age 55 in the *mixed activities (housework)* pathway, and declines at an earlier age, as the probability drops under 0.2% by age 61/62 (Fig. 6-1a). However, relative to the *paid workers* pathway, the probability of engaging in part-time paid work is higher in the second path throughout the 55-70 age range. Additionally, the probability of engaging in informal care was somewhat higher relative to the *paid workers* pathway.

The main feature distinguishing individuals classified in the *mixed activities (housework)* pathway is the higher probability of doing housework. Compared to the other two pathways the probability of doing more than 10 and 20 hours per week of housework is higher (Fig. 6-1b). The probability of doing more than 20 hours per week of housework seems to slightly increase over time, as the probability of engaging in paid work declined in the early 60s. Also, the expected probability of volunteering and civic participation increases marginally from ages 59/60 to 65/66. This suggests that full-time paid work and engagement in housework, volunteering and civic engagement may be competitive activities for individuals classified in this pathway.

The third pathway, *mixed activities (volunteers),* represents 11% of the sample (n=649) and is characterised by a noticeably higher probability of engaging in volunteering and civic engagement between the ages of 55 and 70, relative to the other two pathways (Figure 6-1, right-hand column). Women (61%) are more likely to be sorted in this pathway than men (35%). The high probability of engaging in volunteering and civic engagement is constant throughout the period of interest (fig. 6-1c), suggesting that changes in the levels of paid work that occur during this period do not appear to affect engagement in these activities. The probability of doing full-time work for the *mixed activities (volunteers)* pathway is somewhat higher to that of the *mixed activities (housework)* pathway. Levels of housework (>10 and >20 hpw) are lower relative to the second pathway. However, the probability of providing informal care is higher in the third pathway compared to the second one.

6.5 Sociodemographic and health inequalities in engagement

Multinomial logistic models were used to assess how the three pathways of engagement are related to sociodemographic characteristics and health. Cohort, marital status, education level, housing tenure, self-reported health and presence of chronic health conditions were investigated as predictors of the engagement

pathways in order to understand how sociodemographic characteristics and health may shape inequalities in engagement in later life. Given that the engagement pathways were highly gendered, the analyses have been stratified by gender. The first pathway, *paid workers,* was used as the reference outcome in the multinomial regression among men, given that this was the most common pathway. The second pathway, *mixed activity (housework)* was used as the reference outcome for women as this was the most common. The independent variables have been measured at each individual's baseline, i.e. the first observation between the age of 55 and 70 provided by each respondent. Table 6-6 and 6-7 show the odds ratios (ORs) from the multinomial models. The left-side panel of the tables show the bivariate relationships between each covariate and the latent engagement pathway variable. The right-side panel of the tables show the multivariate relationship between the covariates and the engagement pathways. The odds ratios indicate the odds of being in a given engagement pathway, rather than the reference pathway.

Among men, bivariate relationships show that those born in younger cohort have lower odds of being classified in pathway 2, *mixed activities (housework) and* pathway 3*, mixed activities (volunteering),* than pathway 1, *paid workers* (table 6-6)*.* This effect is also significant also in the multivariate model: men born in 1930s, are less likely to conform to the second pathway than those born before 1930 (OR: 0.51, CI: 0.28; 0.95); men born in the 1930s, 1940s and 1950s are less likely to be classified in the third pathway. Men who are divorced (OR: 1.55, CI: 1; 2.40) and never married (OR: 1.84, CI: 1.17; 2.91) are more likely to follow the second pathway, though this relationship is attenuated and becomes non-significant in the multivariate model.

Results in table 6-6 suggest that men with lower socioeconomic status are more likely to conform to pathway 2 than pathway 1. The multivariate model show that men in the third, fourth and fifth household income quintiles are more likely to be classified in pathway 2 rather than pathway 1. Those who rent (OR: 2.02, CI: 1.34; 3.05) and mortgage holders (OR: 1.59, CI: 1.07; 2.36) are more likely to follow pathway 2 than those who are outright homeowners. Bivariate associations show that men classified in the *mixed activities (housework)* pathway are more likely to have no qualifications (OR: 1.82, CI: 1.24; 2.67) rather than high education levels, compared to *paid workers*. Individuals who rent are more likely to be classified in

Table 6-6 Multivariate multinomial model, association between engagement paths and individual sociodemographic and health characteristic among men (N=2,708)

Reference outcome: Path 1, Paid workers	Bivariate relationships				Multivariate model			
	Path 2, Mixed (Housework)		Path 3, Mixed (Volunteers)		Path 2, Mixed (Housework)		Path 3, Mixed (Volunteers)	
	OR	*CI*	*OR*	*CI*	*OR*	*CI*	*OR*	*CI*
Birth decade[a]								
1930-1939	0.48*	0.26; 0.86	0.60*	0.37; 0.99	0.51*	0.28; 0.95	0.52*	0.31; 0.86
1940-1949	0.51*	0.29; 0.90	0.41***	0.25; 0.68	0.67	0.36; 1.23	0.29***	0.17; 0.49
1950-1959	0.73	0.39; 1.37	0.45**	0.25; 0.80	1.13	0.56; 2.29	0.25***	0.14 0.48
Marital status[b]								
Divorced	1.55*	1.00; 2.40	0.90	0.58; 1.40	1.06	0.66; 1.70	1.13	0.72; 1.78
Widowed	1.59	0.78; 3.24	0.66	0.29; 1.54	1.29	0.63; 2.63	0.74	0.32; 1.72
Never married	1.84**	1.17; 2.91	0.88	0.54; 1.44	1.28	0.77; 2.12	1.24	0.73; 2.10
Education level[c]								
Intermediate	1.49	0.99; 2.24	0.45***	0.33; 0.62	1.13	0.73; 1.77	0.43***	0.31; 0.59
No qualification	1.82**	1.24; 2.67	0.21***	0.15; 0.31	1.09	0.69; 1.74	0.20***	0.13; 0.30
Tenure status[d]								
Mortgage	1.35	0.92; 1.97	0.76	0.57; 1.01	1.59*	1.07; 2.36	0.76	0.56; 1.03
Renting	2.87***	1.97; 4.18	0.51**	0.34; 0.94	2.02***	1.34; 3.05	0.72	0.47; 1.10
Income quintiles[e]								
Second	1.59	0.80; 3.19	0.66*	0.46; 0.94	1.46	0.72; 2.95	0.74	0.51; 1.06
Third	5.21***	2.86; 9.49	0.63*	0.43; 0.93	4.63***	2.45; 8.76	0.76	0.50; 1.15
Fourth	5.49***	3.01; 10.01	0.54**	0.36; 0.82	4.24***	2.17; 8.27	0.71	0.45; 1.12
Fifth (lowest)	5.07***	2.74; 9.37	0.54**	0.35; 0.83	3.58***	1.75; 7.32	0.82	0.49; 1.37
Subjective finances[f]								
Difficult	1.96***	1.45; 2.64	0.67**	0.50; 0.90	1.17	0.82; 1.66	1.03	0.73; 1.45
Health conditions[g]								
At least one	2.00***	1.39; 2.89	1.03	0.78; 1.36	1.61*	1.06; 2.43	1.24	0.92; 1.67
Self-rated health[h]								
fair/poor	1.90***	1.41; 2.56	0.62**	0.46; 0.85	1.05	0.73; 1.51	0.82	0.57; 1.18
GHQ score	1.04**	1.02; 1.07	0.97*	0.94; 0.99	1.02	0.99; 1.05	0.99	0.96; 1.02

Notes: Path 1, *Paid Workers* is the reference outcome. OR: odds ratio; 95% CI: 95% confidence interval; *p<0.05, ** p < 0.01, *** p < 0.001

Reference categories for the independent variables: [a]1929 or earlier, [b]married or cohabiting, [c]high/post-secondary, [d]homeowner, [e]first (highest), [f]living comfortably/doing alright, [g]none, [h]excellent/good.

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18). Author's own calculations.

Table 6-7 Multinomial model: association between engagement paths and individual sociodemographic and health characteristic among women (N=3,152)

Reference outcome:	Bivariate relationships				Multivariate model			
Path 2, Mixed	Path 1, Paid workers		Path 3, Mixed (Volunteers)		Path 1, Paid workers		Path 3, Mixed (Volunteers)	
(housework)	OR	CI	OR	CI	OR	CI	OR	CI
Birth decade[a]								
1930-1939	1.31	0.40; 4.37	0.66	0.42; 1.05	1.04	0.31; 3.55	0.62*	0.39; 0.99
1940-1949	4.48*	1.40; 14.28	0.68	0.43; 1.06	2.86	0.87; 9.41	0.56*	0.35; 0.9
1950-1959	11.35***	3.52; 36.56	0.67	0.40; 1.12	6.08**	1.80; 20.57	0.44**	0.25; 0.75
Marital status[b]								
Divorced	2.54***	1.87; 3.45	0.98	0.71; 1.35	3.65***	2.58; 5.16	1.36	0.95; 1.95
Widowed	0.94	0.60; 1.48	0.89	0.63; 1.27	2.01**	1.20; 3.36	1.05	0.72; 1.53
Never married	1.51	0.84; 0.85	1.88**	1.25; 2.85	2.41**	1.27; 4.56	1.91**	1.26; 2.90
Education level[c]								
Intermediate	0.63**	0.47; 0.85	0.55***	0.43; 0.71	0.94	0.68; 129	0.59***	0.46; 0.77
No qualification	0.23***	0.16; 0.32	0.24***	0.19; 0.32	0.55**	0.37; 0.81	0.30***	0.22; 0.40
Tenure status[d]								
Mortgage	1.99***	1.50; 2.65	0.76*	0.60; 0.97	1.51**	1.11; 2.05	0.75*	0.57; 0.97
Renting	0.71	0.48; 1.04	0.41***	0.30; 0.56	1.15	0.73; 1.80	0.60**	0.43; 0.85
Income quintiles[e]								
Second	0.70*	0.50; 0.97	0.72*	0.53; 0.99	0.81	0.56; 1.16	0.82	0.59; 1.13
Third	0.38***	0.26; 0.56	0.51***	0.37; 0.71	0.52**	0.34; 0.78	0.64*	0.45; 0.91
Fourth	0.28***	0.19; 0.42	0.48***	0.35; 0.66	0.49**	0.31; 0.79	0.69*	0.49; 0.97
Fifth (lowest)	0.12***	0.07; 0.22	0.46***	0.33; 0.64	0.17***	0.09; 0.34	0.66*	0.45; 0.99
Subjective finances[f]								
Difficult	0.51***	0.38; 0.68	0.58***	0.46; 0.74	0.86	0.60; 1.23	0.95	0.72; 1.25
Health conditions[g]								
At least one	0.58***	0.45; 0.76	0.81	0.65; 1.02	0.89	0.65; 1.21	1.12	0.87; 1.44
Self-rated health[h]								
fair/poor	0.34***	0.24; 0.47	0.56***	0.44; 0.71	0.44***	0.29; 0.66	0.80	0.61; 1.06
GHQ score	0.97**	0.95; 0.99	0.95***	0.93; 0.97	0.99	0.96; 1.02	0.97	0.95; 0.99

Notes: Path 2, Mixed activities (Housework) is the reference outcome. OR: odds ratio; 95% CI: 95% confidence interval; *p<0.05, ** p < 0.01, *** p < 0.001

Reference categories for the independent variables: [a]1929 or earlier, [b]married or cohabiting, [c]high/post-secondary, [d]homeowner, [e]first (highest), [f]living comfortably/doing alright, [g]none, [h]excellent/good.

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18). Author's own calculations.

pathway 2, rather than pathway 1 (OR: 2.87, CI: 1.97; 4.18). Conversely, men classified in pathway 3, *mixed activities (volunteers)*, are less likely to have no qualifications (OR: .20 CI: 0.13; 0.30) or intermediate education levels (OR: 0.43, CI: 0.31; 0.59) rather than high education levels. The bivariate models also show that those in pathway 3 are more likely to be homeowners, have higher household income, and report better subjective financial circumstances; however, these associations are not significant in the multivariate model. Findings also show that men who reported having poor or very poor health were also significantly more likely to follow pathway 2 than pathway 1 (OR: 2.25 CI: 1.41; 3.61).

Health is also associated with the latent pathways in the bivariate models (table 6-6, left-side panel). Men who report at least one chronic health condition and worse self-rated health are more likely to follow the second pathway. Worse GHQ score is also associated with being classified in the *mixed activities (housework)* pathway. However, only the association with chronic health condition remains significant in the multivariate model (OR: 1.61 CI: 1.06; 2.43).

Among women there are marked cohort differences, as younger cohorts are more likely to conform to the first pathway, *paid workers* (table 6-7). Women born in the 1950s have raised odds of following the *paid worker pathway* rather than the *mixed activities (housework)* pathway (OR: 6.08 CI: 1.80; 20.57). A similar relationship is observed among women born in the 1940s, which however is not statistically significant in the multivariate model (OR: 2.86 CI: 0.87; 9.41). Furthermore, those born in the 1930s, 1940s and 1950s are less likely to conform to the third pathway than women born before 1930 (table 6-7, right side panel). Marital status is strongly associated with the pathways as divorced, widowed and never married women have higher odds of being in the *paid worker* pathway. Never married women are also more likely to follow the third pathway, *mixed activities (volunteers)* pathway, than the second one.

As for men, socioeconomic variables are associated with the latent pathways among women, as those classified in the *mixed activities (housework)* pathway seem to have lower socioeconomic status. Having no qualifications decreases the odds of being classified in the first and the third pathways (OR: 0.55, CI: 0.37; 0.81 and OR: 0.3, CI: 0.22; 0.4) compared to women with high levels of education (table 6-7, right side panel). Women with intermediate levels of education also have lower odds of following the third pathway. Mortgage holders are more likely to conform to the first

pathway than outright homeowners (OR: 1.51, CI: 1.11; 2.05). Renters (OR: 0.60, CI: 0.43; 0.85) and mortgage holders (OR: 0.75, CI: 0.57; 0.97) have also decreased odds of being classified in the third pathway. Lower household income is associated to with lower odds of following the *paid workers* and the *mixed activities (volunteers)* pathways, rather than the *mixed activities (housework)* pathway. Bivariate associations show that also women who report worse subjective finances are less likely to conform to the first and the third pathways (table 6-7, left side panel).

Association with health variables seem to suggest that women in the *paid workers* and the *mixed activities (volunteers)* pathways have better health. Women who reported fair or poor self-rated health are less likely to follow the first pathway (OR: 0.44, CI: 0.29; 0.66). Bivariate associations show that women who report at least one health condition are less likely to be classified in the first pathway (OR: 0.58, CI: 0.45; 0.76), and worse GHQ score is linked with lower odds of conforming to the first (OR: 0.97, CI: 0.95; 0.99) and third (OR: 0.95, CI: 0.93; 0.97) pathways.

6.6 Conclusion

This chapter examined the interdependent pathways of engagement in paid and unpaid work (informal care provision, volunteering, civic participation, and housework) from mid to later life. This was done using a two staged LCA approach that allowed the identification of qualitatively distinct pathways of engagement in paid and unpaid work in the years preceding and following the SPA. Findings showed how pathways of engagement are associated with sociodemographic characteristics and health. This approach aimed at capturing the complexity of how individuals combine paid and unpaid activities at ages 55 to 70, which is the period when most individuals traditionally retire from the labour market.

Overall, these three pathways suggest that individuals who are more likely to participate in full-time paid work for longer (pathway 1, *paid workers*), are less likely to engage in unpaid activities, relative to the other two pathways. However, within each pathway, declines in the probability of being in paid work are not paralleled by an increase in the probability of undertaking unpaid activities. The exceptions to this are the slight increases in the probabilities of engaging in more than 20 hours of housework per week, volunteering and civic participation for those in pathway 2 (fig. 6-1); nevertheless, this increase is small compared to decline in the probability of full-time paid work. This suggests that individuals who are less

likely to work in mid to later life (pathways 2 and 3) are more likely to engage in unpaid activities to begin with, at age 55. The findings suggest that studies that investigated the relationship between paid work and single unpaid activities, such as caregiving and volunteering (e.g. Carmichael et al. 2010; Carr et al. 2018; Di Gessa & Grundy 2016; Chambré 1984; Hank & Stuck 2008), may be limited given that they only look at short term changes and effects. This chapter's findings underscore that individuals who are most likely to take part in unpaid activities, are more likely to already be engaged in these activities at age 55; moreover, the probability of engaging in unpaid work remains largely constant across ages 55 to 70. Future work could further investigate what factors earlier in the lifecourse determine pathways of engagement in mid to later age.

Similar to previous research, engagement in paid and unpaid work in later life has been found to be significantly associated to socioeconomic and health characteristics (Burr *et al.* 2007; Morrow-Howell *et al.* 2014). Men and women from lower socioeconomic groups and who report poorer health characteristics are less likely to be classified in the third pathway, *mixed activities (volunteers)*. Furthermore, the second pathway, *mixed activities (housework),* is largely made-up by women, is associated with lower socioeconomic position and worse health.

Some limitations of the research presented in this chapter should be noted. First, while the longitudinal approach taken here shows how the probability of engagement in paid and unpaid work changes through time, it does not permit the investigation of the dynamics of these activities. For example, here it was not possible to examine which factors determine whether an individual starts or quits engagement in a given activity. It is not possible to observe whether individuals' engagement is stable over time, or whether they take up and leave activities multiple times over time, as the two stage LCA approach summarises engagement in paid and unpaid work for relatively large subgroups in our sample. Further research may exploit longitudinal data to examine the dynamics of how paid work affects whether an individual takes up or quits engagement in an unpaid activity over time. Second, the findings presented here are relevant to the particular context of the UK and the cohorts used here. Results may be different for other cohorts or in other geographic contexts (Mergenthaler *et al.* 2018). A large majority of the respondents included int his sample, lived in a period when the welfare state promoted the division of labour according to the male breadwinner model (Creighton 1999; van der Horst *et al.*

2017). Pathways of engagement in paid and unpaid activities may be different for future cohorts. Finally, an additional limitation is that only binary measures for informal caregiving, civic engagement and volunteering were used, in order to preserve the parsimony of the two staged LCA which was susceptible to small numbers in categorical variables. Volunteering and civic engagement were considered only when done at least on a monthly basis, while informal care provision was considered regardless of intensity or place (e.g. co-residential and extra residential care provision). Furthermore, for the same reason it was not possible to consider self-employed individuals separately.

Chapter 7

The longitudinal relationship between paid work and informal care provision

7.1 Introduction

This chapter examines the relationship between participation in the paid labour market and provision of informal care in mid to later life. The key objective of this chapter is to understand whether paid work affects individuals' likelihood of engaging in informal care provision, gaining an insight on the longitudinal relationship between these two forms of work. Furthermore, additional analyses explore whether the relationship varies when considering carers who provide over 20 hours of care per week, and whether participation in the paid labour market affects the number of hours of care provided per week.

As reviewed in chapter three, previous research has often reported that informal carers may struggle to combine their caring role with participation in the paid labour market. This may lead to reducing participation in paid work or dropping out of the labour force altogether, with repercussion for the financial outcomes of unpaid carers (Berecki-Gisolf *et al.* 2008; Carmichael & Charles 2003b; Carr *et al.* 2015; Ciani 2012; Evandrou & Glaser 2003; Heitmueller 2007; Heitmueller & Inglis 2007; Henz 2004; King & Pickard 2013; Leigh 2010; Michaud *et al.* 2010; Nguyen & Connelly 2014; Principi *et al.* 2014). However, previous research has mostly focused on the effect of providing informal care on participation in paid work, rather than the other way around. As discussed in literature review (section 3.5.1), few studies examined how paid work affects engagement in informal care provision, and they have yielded mixed results (Boaz & Muller 1992; Moen *et al.* 1994; Pavalko & Artis 1997; Robison *et al.* 1995). Most of these studies exclude individuals over the age of 50, or those over the age of retirement, despite people in in mid to later life are overwhelmingly the most active age group in the provision of unpaid care in the UK and elsewhere (ONS 2013a).

In order to contribute to the current literature and further the understanding of the relationship between paid work and informal care provision, the following research questions are examined in this chapter (see chapter four, section 4.7.1, for a more detailed outline of the objectives and research questions):

1. What are the sociodemographic and health characteristics of informal carers in the 55 to 70 age group, and how do they differ from non-carers? (section 7.2)
2. What is the longitudinal relationship between participation to the paid labour market (out of work, part-time and full-time self-employment, and part-time and

full-time employment) and informal care provision in mid to later life, and are there differences by gender? (section 7.3)

3. Does prior paid work status affect engagement in informal care at the following observation point, and are there differences by gender? (section 7.4)
4. Does paid work affect the intensity of caring (hours per week) among carers? Are these relationships similar for men and women? (section 7.5)

The research presented in this chapter uses harmonised data from the BHPS and UKHLS, from year 1991 to 2015. Unlike the following chapter, which examines volunteering, for this research it was possible to use every wave from the BHPS and the UKHLS (except UKHLS wave 1), as the questions on informal care provision were asked at every wave. It should be noted that the time gaps between each wave are of one year, rather than two; therefore, this may hamper comparison of the findings of the lagged models for volunteering and informal care provision.

Section 7.2.1 describes the characteristics of the analytical sample at baseline and investigate bivariate cross-sectional relationships between caregiving and the other independent variables (paid work, demographic characteristics, socioeconomic status, and health). Following this, multivariate analyses show how participation in the labour market affects engagement in informal care provision (sections 7.2.2 to 7.2.5). Logistic WB-RE models are used to examine the effect of participation in full-time and part-time paid work on engagement in caregiving. Section 7.3 presents multivariate results, distinguishing between two outcomes: provision of any time of care per week and care for at least 20 hours per week – tables 7.2.2 and 7.2.3 respectively. Sections 7.4 extends these analyses by examining the prospective relationship in order to eschew reverse causality as a possible mechanism. Time lagged models are used to evaluate the temporal relationship of interest between paid work (t_{-1}) and informal care provision (t_1). Section 7.5 examines the relationship between paid work and engagement in informal care, restricting the analysis to carers, to evaluate whether paid work affects the intensity of care provided by informal carers. Models show the odds of carers of providing at least 20 hours of care per week according to employment status. Finally, section 7.6 includes concluding remarks.

7.2 Baseline characteristics of carers and non-carers

Cross-sectional descriptive statistics are presented in table 7-1, showing the bivariate relationships between informal care provision (none, 0 to 19 hours per week, more than 20 hours per week, hpw) and all other independent variables, at each respondent's baseline observation. Chi square tests and analyses of variance (ANOVAs) show the statistical significance of each bivariate relationship. This cross-sectional analysis uses baseline information from all the 8,590 respondents aged 55 to 70, who are included in the main analytical sample used in the longitudinal models in section 7.3.

While 76% of the baseline sample is made-up by non-carers (n=6510), nearly one in four (~24%) reported that they were providing informal care to someone who is sick or disabled; moreover, 528 individuals (6.2%) cared for 20 hpw. There is a strongly significant relationship between informal care and paid work ($p<0.001$). The distribution of the informal care variable across paid work, shows that carers are more likely to be out of paid work, and much less likely to be in full-time employment. The difference is particularly stark for those who provide care more than 20 hpw, as 69.7% of them are not in the paid labour force, and only 18% of them are in full-time employment. The trend is different for part-time work, as those who provide fewer hours of care, seem to be more likely to work in part-time (self)employment (1.6% and 7.3%), compared to both non-carers and more intense carers.

There is also strong evidence of bivariate relationships between informal care and all other sociodemographic and health variables ($p<0.001$). Descriptive results in table 7-1, show that care is significantly associated with gender, birth decade (cohort), marital status, highest attained education, tenure status, income quintiles, subjective financial situation, wellbeing (GHQ score) and self-rated health. As expected, the distribution of care by gender shows that more women provided care than men, with the difference being stronger among those providing 20 hpw of care: 65.3% women and 34.7% men. Differences by birth cohort may reflect historical changes in social policies, age effects, as well as demographic trends - e.g. varying rates of cohabitation and childlessness by birth cohort. The mean age of carers and non-carers gravitates around ages 58 and 59, as non-linear effects of age may not be visible by merely inspecting the mean ages – in the models, non-linear

Table 7-1 Descriptive statistics associations at each respondent's baseline, N=8590.

Percentage or Mean (SD)				
		Informal care (hours per week)		
Variables	Full sample	None	0 to 20	20 or more
Paid Work, p < 0.001				
Out of paid work	48.7%	48.3%	43.3%	69.7%
Self-employed part-time	1.2%	1.1%	1.6%	0.8%
Self-employed full -time	8.0%	8.3%	7.7%	5.1%
Part-time employment	6.6%	6.4%	7.3%	6.4%
Full-time employment	35.6%	36.0%	40.1%	18.0%
Gender, p = 0.001				
Male	46.3%	48.4%	41.6%	34.7%
Female	53.7%	51.6%	58.4%	65.3%
Age, p < 0.001				
Mean (SD)	58.8 (4.7)	58.9 (4.9)	58.1 (4.5)	58.8 (4.7)
Birth decade, p < 0.001				
<1920	14.4%	15.4%	11.5%	11.0%
1930-1939	29.1%	29.6%	27.0%	29.7%
1940-1949	33.4%	32.9%	36.0%	32.2%
1950-1959	23.1%	22.2%	25.5%	27.1%
Marital Status, p < 0.001				
Married/ partnered	71.3%	69.9%	76.0%	75.2%
Divorced/separated	12.5%	12.8%	11.6%	11.9%
Widowed	9.1%	10.1%	6.1%	4.9%
never married/partnered	7.1%	7.2%	6.4%	8.0%
Education level, p < 0.001				
Post-secondary	18.1%	17.4%	22.9%	12.3%
Intermediate	44.5%	43.8%	47.4%	43.9%
No qualification	37.5%	38.8%	29.6%	43.8%
Tenure (Modal), p < 0.001				
Owned	47.6%	47.1%	51.2%	42.8%
Mortgage	29.2%	29.4%	30.4%	23.5%
Renting	23.3%	23.6%	18.4%	33.7%
Income quintiles, p < 0.001				
First (highest)	21.0%	21.0%	24.0%	12.9%
Second	19.2%	19.5%	20.3%	12.1%
Third	18.9%	18.6%	19.7%	19.9%
Fourth	21.4%	21.0%	19.1%	33.1%
Fifth (Lowest)	19.6%	20.0%	16.9%	22.0%
Subjective finances, p < 0.001				
Living comfortably/alright	61.8%	61.5%	66.6%	51.1%
Getting by/difficult	38.2%	38.5%	33.4%	48.9%
GHQ score, p < 0.001				
Mean (SD)	11.4 (5.5)	11.3 (5.6)	11.3 (5.2)	12.4 (5.6)
Self-rated health (%), p < 0.001				
Excellent/Good	66.1%	65.6%	70.3%	60.6%
Fair/poor/very poor	33.9%	34.4%	29.7%	39.4%
Total				
Percentage, %	100%	76%	18.1%	6.2%
Frequency, n	8590	6510	1552	528

Notes: only the baseline for each individual is considered herein, i.e. only the first recorded observation for each person in the available waves from BHPS and UKHLS are used. P-values for the relationship between volunteering and other variables were obtained using a Chi-square test for categorical variables, and ANOVA for continuous variables.
PT: part-time; FT: full-time; SD: standard deviation; HH: household. * p < 0.05, ** p < 0.01, *** p < 0.001.
Source: BHPS (waves 1 to 18) and UKHLS (waves 2 to 6). Author's own calculations.

effects are included in the form of quadratic terms. Interestingly, the socioeconomic trend for those providing 0 to 20 hours of care per week and those providing at least 20 hpw seem to be going in opposite directions. Those providing fewer hours of care per week seem to have better education, higher income, more likely to be homeowners, report better financial situation than non-carers. By contrast the opposite is true of those providing more hours of care per week – lower education, renters, lower income, more likely to report worse financial situation. Regarding health, those who provide at least 20 hpw of care have average worse scores of mental health/wellbeing (mean: 12.4, SD: 5.6), and are more likely to report poorer self-rated health; by contrast, fewer respondents seem to report poorer health among those providing 0 to 20 hours of care per week (29.7%), than non-carers (34.4%).

7.3 Multivariate relationship between paid work and informal care: decomposing within and between effects

7.3.1 Is paid work related to providing any care?

The relationship between paid work and informal care provision, adjusted for potential confounders is presented in table 7-2. WB-RE models were used to distinguish the effect that is due to subject specific differences within individuals' observations over time, from averaged differences between individuals. Significant effects of employment status on caregiving through between estimates would suggest that the effect of employment is driven by unobserved between-individual characteristics which have not been controlled for, or selection effects as individuals in employment may be inherently different from those out of paid work, such as personality traits differences or different experiences earlier in the lifecourse (e.g. labour market attachment). Within effects estimates, which are analogous to FE model estimates (Schunck & Perales 2017), instead facilitate better causal inferences as these indicate whether, for an individual, changing employment status affects the likelihood of caregiving.

For each gender, four models are presented in Table 7-2 and in all subsequent tables of model estimates: model 1 shows the bivariate unadjusted estimates; model 2 controls for demographic characteristics (age, age squared, birth decade and marital status); model 3 also adjusts for socioeconomic variables (highest level of education attained, modal housing tenure, subjective financial

circumstances, and income quintiles); and model 4 further controls for health (GHQ mental health score and self-rated health). The outcome is the binary indicator distinguishing those who provide any care, i.e. including both those who provide 0 to 20 hpw and those who provide 20 or more hpw of care. Odds ratios and significance levels are reported.

Table 7-2 shows the odds of providing any care estimated with the WB-RE logistic model by gender. The relationship between paid work status and informal care does not seem to differ between men and women. Within estimates for full-time employment show that for any given man in our sample, working full-time leads to lower odds of providing care (OR 0.70 CI: 0.58, 0.84). The relationship remains broadly unaltered after controlling for potential confounders in table 7-3 (left-hand panel). The relationship according to between-person estimates is in the same direction: on average, men who participate in full-time employment are less likely of providing informal care in the fully adjusted model (OR 0.40 CI: 0.30, 0.55). Subject specific within-person estimates show that self-employment and part-time employment do not affect the odds of providing informal care. However, averaged between person estimates indicate that full-time self-employed men are less likely to engage in informal care (OR 0.47 CI: 0.32, 0.69).

For women, full-time employment is associated with informal care, according to both within- and between-person estimates (table 7-3, right-hand panel). For a given woman, full-time employment leads to lower odds of providing informal care (OR 0.70 CI: 0.59, 0.82), and on average women that are in full-time employment are less likely to provide informal care (OR 0.63 CI: 0.47, 0.86). Therefore, both direct influences and selection effects underlie this relationship. In addition, the within estimate for part-time employment also shows decreased odds of caring, albeit it is not-statistically significant (OR 0.63 CI: 0.72, 1.03, NS).

Regarding other independent variables, individuals belonging to more recent cohorts seem to be more likely to provide informal care among men and women. Being divorced, widowed and never married is associated with lower odds of providing informal care, compared to being married. This is expected, given that individuals who are married are generally more likely to provide care for their spouses. Those with lower education have lower odds of providing care compared to those with post-secondary education for both genders. Men who have a mortgage are less likely to provide informal care than homeowners, while women in the fourth

Table 7-2 - Odds of providing any informal care; within-between RE models.

	Men								Women							
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]																
SE part-time	1.21	0.78,1.86	1.12	0.73,1.73	1.10	0.71,1.70	1.08	0.70,1.68	1.13	0.78,1.63	0.94	0.65,1.37	0.94	0.65,1.37	0.95	0.65,1.38
SE full -time	1.11	0.87,1.42	0.97	0.75,1.26	0.96	0.73,1.25	0.95	0.73,1.24	1.24	0.84,1.82	0.92	0.62,1.37	0.93	0.63,1.38	0.94	0.64,1.40
Part-time	1.04	0.77,1.39	0.99	0.73,1.34	0.98	0.72,1.32	0.97	0.72,1.31	1.09	0.92,1.29	0.85	0.71,1.02	0.85	0.71,1.02	0.86	0.72,1.03
Full-time	0.81**	0.70,0.93	0.72***	0.61,0.85	0.71***	0.59,0.84	0.70***	0.58,0.84	0.97	0.84,1.12	0.68***	0.58,0.80	0.70***	0.59,0.83	0.70***	0.59,0.82
BP - Paid work[a]																
SE part-time	1.05	0.30,3.63	0.78	0.22,2.75	0.73	0.21,2.57	0.70	0.20,2.46	1.85	0.64,5.35	1.29	0.44,3.83	1.15	0.39,3.40	1.18	0.40,3.49
SE full -time	0.68*	0.48,0.97	0.47***	0.32,0.68	0.49***	0.34,0.72	0.47***	0.32,0.69	1.39	0.73,2.65	0.84	0.43,1.62	0.79	0.41,1.53	0.79	0.41,1.53
Part-time	1.54	0.73,3.26	1.39	0.65,2.96	1.30	0.61,2.77	1.25	0.58,2.68	1.27	0.84,1.90	0.84	0.55,1.27	0.82	0.54,1.25	0.83	0.55,1.26
Full-time	0.64***	0.50,0.83	0.40***	0.30,0.54	0.42***	0.31,0.58	0.40***	0.30,0.55	1.11	0.86,1.43	0.64**	0.48,0.85	0.63**	0.47,0.85	0.63**	0.47,0.86
Age	-		0.99	0.74,1.32	0.98	0.73,1.31	0.98	0.73,1.31	-		1.02	0.79,1.31	1.00	0.77,1.29	1.02	0.79,1.31
Age squared	-		1.00	1.00,1.00	1.00	1.00,1.00	1.00	1.00,1.00	-		1.00	1.00,1.00	1.00	1.00,1.00	1.00	1.00,1.00
Birth decade[b]																
1930-1939	-		1.26	0.90,1.76	1.24	0.88,1.74	1.25	0.89,1.76	-		1.36	1.00,1.86	1.33	0.97,1.82	1.32	0.96,1.80
1940-1949	-		1.81***	1.27,2.57	1.80**	1.27,2.57	1.83***	1.28,2.60	-		1.26	0.92,1.73	1.22	0.88,1.68	1.20	0.87,1.65
1950-1959	-		1.95**	1.30,2.93	1.97**	1.29,3.00	1.98**	1.30,3.02	-		1.65**	1.14,2.37	1.55*	1.06,2.26	1.51*	1.03,2.20
Marital status[c]																
Divorced	-		0.52***	0.39,0.68	0.51***	0.39,0.67	0.51***	0.39,0.67	-		0.52***	0.42,0.66	0.54***	0.43,0.68	0.54***	0.43,0.68
Widowed	-		0.22***	0.15,0.31	0.22***	0.15,0.31	0.22***	0.15,0.31	-		0.22***	0.18,0.27	0.23***	0.19,0.28	0.22***	0.18,0.28
Never mar.	-		0.49***	0.35,0.68	0.49***	0.35,0.68	0.49***	0.35,0.68	-		0.61**	0.42,0.88	0.60**	0.41,0.87	0.60**	0.41,0.87
Education level[d]																
Intermediate	-		-		0.84	0.64,1.09	0.85	0.65,1.10	-		-		0.88	0.69,1.12	0.88	0.69,1.12
Low	-		-		0.65**	0.48,0.88	0.67**	0.49,0.90	-		-		0.64**	0.49,0.84	0.64**	0.49,0.84
Modal tenure																
Mortgage	-		-		0.77*	0.61,0.99	0.78*	0.61,1.00	-		-		0.84	0.66,1.06	0.83	0.66,1.05
Renting	-		-		1.20	0.92,1.57	1.23	0.94,1.60	-		-		0.84	0.67,1.07	0.84	0.66,1.06
Income quintiles[f]																
Second	-		-		1.00	0.86,1.17	1.00	0.86,1.17	-		-		1.00	0.87,1.16	1.01	0.87,1.17
Third	-		-		1.01	0.85,1.20	1.01	0.86,1.20	-		-		1.14	0.98,1.34	1.15	0.98,1.34
Fourth	-		-		1.08	0.90,1.31	1.09	0.90,1.31	-		-		1.28**	1.09,1.51	1.28**	1.09,1.51
Fifth, lowest	-		-		0.89	0.72,1.10	0.89	0.72,1.10	-		-		1.01	0.85,1.21	1.01	0.85,1.21
Subj. finances[g]																
Difficult	-		-		1.06	0.94,1.20	1.06	0.94,1.20	-		-		1.05	0.95,1.17	1.03	0.93,1.15
Self-rated health[h]																
fair/poor	-		-		-		0.85**	0.75,0.96	-		-		-		0.89*	0.80,0.99
GHQ score	-		-		-		1.00	0.99,1.02	-		-		-		1.02***	1.01,1.03
N (observations)	24,901								29,819							
n (individuals)	3,981								4,609							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income quintiles; Model 4: model 3+self-rated health and GHQ score. Reference categories: [a]no paid work, [b]1929 or earlier, [c]married or cohabiting, [d]high/post-secondary, [e]homeowner, [f]first (highest), [g]living comfortably/doing alright, [h]excellent/good. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * p < 0.05, ** p < 0.01, *** p < 0.001. *Source: BHPS (waves 1 to 18) and UKHLS (waves 2 to 6)*. Author's own calculations.

Table 7-3 - Odds of providing at least 20 hours per week of informal care; within-between RE models.

	Men								Women							
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]																
SE part-time	0.72	0.26,2.00	0.79	0.29,2.13	0.73	0.26,2.05	0.73	0.26,2.07	0.62	0.25,1.51	0.56	0.23,1.38	0.55	0.22,1.36	0.58	0.23,1.44
SE full -time	0.76	0.43,1.34	0.85	0.47,1.51	0.88	0.48,1.61	0.87	0.48,1.60	0.67	0.31,1.45	0.57	0.26,1.24	0.58	0.27,1.26	0.62	0.29,1.35
Part-time	0.20***	0.10,0.42	0.23***	0.11,0.48	0.22***	0.10,0.47	0.22***	0.10,0.47	0.56***	0.40,0.77	0.51***	0.36,0.71	0.51***	0.36,0.71	0.53***	0.38,0.74
Full-time	0.28***	0.20,0.39	0.34***	0.24,0.49	0.35***	0.24,0.52	0.35***	0.24,0.53	0.55***	0.42,0.73	0.48***	0.35,0.65	0.50***	0.36,0.68	0.50***	0.37,0.69
BP - Paid work[a]																
SE part-time	0.06	0.00,3.66	0.04*	0.00,0.97	0.06	0.00,4.61	0.06	0.00,4.73	0.08*	0.01,0.89	0.04*	0.00,0.50	0.06*	0.01,0.68	0.07*	0.01,0.76
SE full -time	0.20***	0.09,0.48	0.13***	0.06,0.29	0.20***	0.09,0.48	0.21***	0.09,0.50	0.35	0.10,1.21	0.18**	0.05,0.64	0.25*	0.07,0.84	0.27*	0.08,0.94
Part-time	0.53	0.13,2.16	0.43	0.11,1.68	0.72	0.18,2.93	0.77	0.19,3.15	0.63	0.34,1.17	0.37**	0.20,0.70	0.40**	0.21,0.75	0.45*	0.24,0.85
Full-time	0.08***	0.04,0.17	0.06***	0.03,0.12	0.08***	0.04,0.16	0.08***	0.04,0.16	0.34***	0.22,0.52	0.17***	0.11,0.27	0.21***	0.13,0.35	0.24***	0.15,0.39
Age	-		0.71	0.40,1.26	0.74	0.41,1.35	0.74	0.41,1.35	-		0.98	0.63,1.51	0.96	0.62,1.48	1.03	0.66,1.59
Age squared	-		1.00	1.00,1.01	1.00	1.00,1.01	1.00	1.00,1.01	-		1.00	1.00,1.00	1.00	1.00,1.00	1.00	1.00,1.00
Birth decade[b]																
1930-1939	-		1.91*	1.01,3.62	2.27*	1.15,4.48	2.25*	1.14,4.45	-		2.56**	1.43,4.59	2.74***	1.53,4.92	2.64**	1.48,4.71
1940-1949	-		3.96***	2.02,7.77	5.32***	2.64,10.7	5.16***	2.56,10.4	-		3.37***	1.87,6.06	3.79***	2.10,6.84	3.48***	1.94,6.25
1950-1959	-		4.61***	2.1,10.14	5.85***	2.47,13.9	5.59***	2.35,13.3	-		5.09***	2.66,9.73	6.10***	3.14,11.9	5.46***	2.82,10.6
Marital status[c]																
Divorced	-		0.53*	0.32,0.88	0.42**	0.25,0.72	0.42**	0.25,0.72	-		0.47***	0.33,0.67	0.41***	0.28,0.59	0.39***	0.27,0.57
Widowed	-		0.06***	0.03,0.12	0.04***	0.02,0.09	0.04***	0.02,0.09	-		0.10***	0.07,0.15	0.10***	0.07,0.15	0.09***	0.06,0.13
Never mar.	-		0.93	0.53,1.62	0.72	0.41,1.28	0.73	0.41,1.29	-		0.61	0.35,1.05	0.57*	0.33,0.99	0.57*	0.33,0.99
Education level[d]																
Intermediate	-		-		2.12*	1.13,3.98	2.13*	1.13,4.02	-		-		1.38	0.94,2.02	1.33	0.91,1.96
Low	-		-		2.85**	1.47,5.50	2.83**	1.46,5.49	-		-		1.53*	1.02,2.30	1.46	0.97,2.19
Modal tenure																
Mortgage	-		-		1.46	0.89,2.39	1.46	0.89,2.40	-		-		1.01	0.71,1.43	0.97	0.68,1.37
Renting	-		-		3.40***	2.18,5.29	3.43***	2.20,5.35	-		-		2.15***	1.54,3.02	1.97***	1.40,2.77
Income quintiles[f]																
Second	-		-		1.65*	1.11,2.45	1.65*	1.11,2.46	-		-		1.13	0.85,1.50	1.15	0.87,1.53
Third	-		-		1.42	0.94,2.16	1.43	0.94,2.16	-		-		1.37*	1.04,1.82	1.40*	1.05,1.85
Fourth	-		-		1.99**	1.29,3.06	2.00**	1.30,3.09	-		-		1.41*	1.05,1.89	1.41*	1.05,1.89
Fifth, lowest	-		-		1.15	0.72,1.84	1.16	0.72,1.85	-		-		1.06	0.77,1.45	1.07	0.78,1.47
Subj. finances[g]																
Difficult	-		-		1.31*	1.05,1.64	1.26	1.00,1.58	-		-		0.89	0.75,1.06	0.83*	0.69,0.99
Self-rated health[h]																
fair/poor	-		-		-		0.88	0.69,1.11	-		-		-		1.05	0.88,1.25
GHQ score	-		-		-		1.03**	1.01,1.06	-		-		-		1.06***	1.05,1.08
N (observations)	24,901								29,819							
n (individuals)	3,981								4,609							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income quintiles; Model 4: model 3+self-rated health and GHQ score. Reference categories: [a]no paid work, [b]1929 or earlier, [c]married or cohabiting, [d]high/post-secondary, [e]homeowner, [f]first (highest), [g]living comfortably/doing alright, [h]excellent/good. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * p < 0.05, ** p < 0.01, *** p < 0.001. *Source: BHPS (waves 1 to 18) and UKHLS (waves 2 to 6)*. Author's own calculations.

household quintile are more likely to provide informal care compared to individuals in the top quintile. Men and women who report worse self-rated health have lower odds of providing care. Conversely, women with worse mental health score have higher odds providing informal care.

7.3.2 Is paid work related to providing at least 20 hours of care per week?

Table 7-3 (left-hand panel) shows that men in in full time employment have decreased odds of providing 20 or more hours of care per week, according to both within and between effects, compared to those who are not in paid work. Within estimates indicate that for a given individual, full time employment leads to a lower likelihood of providing care (OR:0.35 CI: 0.24, 0.53). This effect is constant across all four models. Therefore, this suggests that for individuals who changed employment status between the ages of 55 to 70, being in full-time rather than out of work is associated with lower odds of providing informal care. There is also a significant within-person effect for men in part-time employment, which leads to lower odds of caring (OR: 0.22 CI: 0.10, 0.47). The averaged between effect is significant for both for full-time employees (OR: 0.08, CI: 0.04, 0.16) and self-employed (OR: 0.21, CI: 0.09, 0.50) after controlling potential confounders, indicating that, on average, men who work full-time have significantly lower odds of providing 20 hpw of care, compared to those who are out of work. The between-person relationship for part-time employment and part-time self-employment show decreased odds, although they are non-significant.

Table 7-3 (right-hand panel) shows women's estimates of engaging in informal care for 20 hpw. Similarly to what observed for men, full-time employment is associated with lower odds of care, according to within (OR 0.50 CI: 0.37, 0.69) and between-person (OR 0.24 CI: 0.15, 0.39) effects, and part-time employment is associated through within estimates (OR 0.53 CI: 0.38, 0.74). Therefore, the results suggest that among women working part- and full-time leads to lower odds of engaging in informal care provision. The relationships for part and full-time self-employment are in the same direction, although they are not statistically significant.

Between-person estimates show that all considered forms of paid work are negatively associated with informal care provision, compared to not being in paid work. Therefore, women who participate in part- and full-time (self)employment are on average less likely to provide 20 hpw of care. The estimates for full-time self-employment (model 2, OR 0.18, CI: 0.05, 0.64) and part-time employment (model 2,

OR 0.37, CI: 0.20, 0.70) become statistically significant after adjusting for sociodemographic factors in model 2.

Other independent variables in table 7-3, show similar trends for men and women. Younger cohorts, i.e. born in more recent decades, have markedly higher odds of providing informal care. Individuals who are divorced and widowed have substantially lower odds of providing informal care compared to individuals who are married. Men and women who have lower education and who rent rather than being homeowners, are more likely to provide 20 how of care. Household income seem to show a similar trend, as individuals in lower income quintiles have higher odds. Men in the second and fourth income quintiles, and women in the third and fourth, have raised odds of providing care. Interestingly, while those who report poorer subjective financial circumstances are more likely to provide care among men, the opposite relationship is found among women. Regarding health characteristics, estimates show that higher mental health score is associated with a higher likelihood of providing informal care.

To summarise, full-time employment, for both men and women, is negatively associated with informal care provision (both at lower and higher intensity of care) through subject specific and averaged effects. This shows that while part of this relationship may be caused by selection effects and unobserved confounding (the between effects), the rest of the relationship is mediated through direct, putatively causal, influences of full-time employment on informal care provision. While part-time and self-employment do not seem to directly affect the likelihood of providing any amount of care, when we consider only those who provide 20 hpw of care, there are significant negative effects, especially for part-time employment. This suggest that part-time paid work and self-employment, may limit only intense care provision, above 20 hours per week. However, it should be noted that the effect of self-employment was statistically significant only through between effect, suggesting that selection effects may be driving this relationship.

7.4 Prospective relationship between paid work and subsequent care provision: lagged within-between RE models

The results from the previous section have shown that full-time paid work decreases men and women's likelihood of providing informal care. These relationships are driven by both within- and between-person variability, indicating

that both selection effects and direct causal influences may be playing a role (tables 7-2, 7-3). In addition, the results suggested that part-time employment may be also limiting engagement in informal care for 20 or more hours per week. Self-employment seemed to affect informal care provision only through between effects, suggesting that selection underlies influences of self-employment on care.

However, estimates from WB-RE models do not give a definitive indication as to whether prior paid work status might affect subsequent engagement in informal care. Although the models used in the previous sections account for the longitudinal nature of the data, they do not explicitly model the temporal order of the relationship of interest, i.e. the effect of prior paid work on engagement in informal care. Thus, reverse causality may affect the relationships reported in the previous section.

To eschew any contamination by reverse causality mechanisms, the prospective relationship between employment status and informal care is examined in this section, in order to answer the research question: does prior employment affect subsequent the likelihood of providing informal care? To analyse this prospective relationship, time-lagged models are used to estimate how paid work from a previous wave affects informal care provision at follow-up. Unlike chapter eight, the gaps between each wave are of one year rather than two. While information on volunteering in the BHPS and the UKHLS was collected only at every other wave, information on informal care was collected at every wave. Lagged models can provide better evidence to gain an insight on the causal link, as they explicitly model the temporal order of the relationship of interest. However, in these analyses the sample is reduced, compared to models in the previous section, as only individuals who have provided information over two consecutive waves are included, and every individual loses one year of information due to the effect of "lagging" the independent variables.

7.4.1 Does prior paid work affect subsequent engagement in informal care?

Table 7-4 shows the effect of prior employment (t_{-1}) on subsequent monthly informal care provision (t_1), for men (upper panel) and women (lower panel). Within estimates show that among men, prior full-time employment leads to lower odds of care at follow-up, compared to being out of the paid labour market. The relationship remains after controlling for demographic, socioeconomic and health characteristics (OR 0.69 CI: 0.56, 0.84). Analogously to models presented in the

Table 7-4. Odds of providing any informal care at follow-up; within-between RE models.

	Men							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.91	0.55,1.50	0.85	0.51,1.41	0.84	0.51,1.40	0.83	0.50,1.38
SE full -time	1.03	0.78,1.37	0.89	0.66,1.19	0.89	0.66,1.20	0.88	0.65,1.19
Part-time	1.04	0.74,1.45	0.99	0.70,1.38	0.99	0.70,1.40	0.98	0.70,1.39
Full-time	0.79**	0.67,0.93	0.68***	0.57,0.82	0.69***	0.57,0.85	0.69***	0.56,0.84
BP - Paid work[a]								
SE part-time	1.86	0.45,7.72	1.37	0.33,5.72	1.28	0.30,5.39	1.20	0.28,5.08
SE full -time	0.62*	0.42,0.92	0.43***	0.28,0.64	0.44***	0.29,0.68	0.42***	0.28,0.64
Part-time	1.28	0.57,2.88	1.09	0.48,2.48	1.04	0.46,2.37	0.99	0.43,2.25
Full-time	0.62***	0.46,0.82	0.39***	0.28,0.54	0.42***	0.30,0.59	0.40***	0.28,0.56
N (observations)	19,865							
n (individuals)	3,409							
	Women							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.04	0.69,1.58	0.86	0.57,1.32	0.88	0.57,1.34	0.88	0.58,1.35
SE full -time	1.87**	1.21,2.88	1.37	0.88,2.13	1.38	0.89,2.15	1.39	0.89,2.17
Part-time	1.20	0.99,1.45	0.92	0.76,1.13	0.93	0.76,1.14	0.94	0.76,1.14
Full-time	0.96	0.82,1.12	0.64***	0.53,0.77	0.66***	0.55,0.80	0.66***	0.55,0.80
BP - Paid work[a]								
SE part-time	1.64	0.53,5.06	1.16	0.37,3.60	1.00	0.32,3.12	1.02	0.33,3.18
SE full -time	1.30	0.65,2.60	0.85	0.42,1.73	0.77	0.38,1.57	0.78	0.38,1.59
Part-time	1.38	0.89,2.11	0.96	0.62,1.48	0.93	0.60,1.44	0.94	0.60,1.46
Full-time	1.01	0.76,1.33	0.61**	0.45,0.84	0.58***	0.42,0.80	0.58**	0.42,0.81
N (observations)	23,972							
n (individuals)	3,970							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income quintiles; Model 4: model 3+self-rated health and GHQ score. Reference categories: [a]no paid work, [b]1929 or earlier, [c]married or cohabiting, [d]high/post-secondary, [e]homeowner, [f]first (highest), [g]living comfortably/doing alright, [h]excellent/good. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: BHPS (waves 1 to 18) and UKHLS (waves 2 to 6). Author's own calculations.

Table 7-5. Odds of providing at least 20 hours per week of informal care at follow-up; within-between RE models.

	Men							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.37	0.47,4.04	1.44	0.49,4.28	1.32	0.41,4.25	1.33	0.41,4.27
SE full -time	0.55	0.29,1.04	0.57	0.29,1.11	0.56	0.28,1.14	0.56	0.27,1.14
Part-time	0.63	0.32,1.24	0.68	0.34,1.35	0.67	0.33,1.38	0.68	0.33,1.39
Full-time	0.32***	0.22,0.46	0.35***	0.23,0.52	0.34***	0.22,0.53	0.34***	0.22,0.54
BP - Paid work[a]								
SE part-time	0.14	0.01,2.83	0.08	0.00,1.95	0.37	0.01,13.57	0.38	0.01,13.62
SE full -time	0.15***	0.07,0.35	0.10***	0.04,0.24	0.13***	0.04,0.39	0.13***	0.04,0.40
Part-time	0.52	0.13,2.09	0.42	0.10,1.81	0.71	0.16,3.11	0.73	0.17,3.23
Full-time	0.14***	0.08,0.24	0.08***	0.04,0.16	0.12***	0.06,0.26	0.12***	0.06,0.26
N (observations)	19,865							
n (individuals)	3,409							
	Women							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.13	0.44,2.90	1.03	0.40,2.66	1.00	0.39,2.61	1.05	0.40,2.73
SE full -time	1.21	0.53,2.77	0.99	0.43,2.27	0.99	0.43,2.28	1.03	0.45,2.38
Part-time	0.78	0.55,1.12	0.71	0.49,1.02	0.70	0.48,1.01	0.72	0.50,1.04
Full-time	0.61**	0.45,0.83	0.50***	0.36,0.70	0.49***	0.35,0.70	0.50***	0.36,0.71
BP - Paid work[a]								
SE part-time	0.06*	0.00,0.92	0.03*	0.00,0.53	0.05*	0.00,0.75	0.06*	0.00,0.81
SE full -time	0.39	0.10,1.43	0.22*	0.06,0.84	0.29	0.08,1.06	0.31	0.08,1.17
Part-time	0.54	0.28,1.06	0.34**	0.17,0.68	0.37**	0.19,0.73	0.40**	0.20,0.80
Full-time	0.41***	0.25,0.65	0.22***	0.13,0.36	0.26***	0.16,0.44	0.29***	0.18,0.49
N (observations)	23,972							
n (individuals)	3,970							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income quintiles; Model 4: model 3+self-rated health and GHQ score. Reference categories: [a]no paid work, [b]1929 or earlier, [c]married or cohabiting, [d]high/post-secondary, [e]homeowner, [f]first (highest), [g]living comfortably/doing alright, [h]excellent/good. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Source: BHPS (waves 1 to 18) and UKHLS (waves 2 to 6). Author's own calculations.

previous section, the effect of full-time employment is driven by both between- and within-person variability, as on average men in full-time employment are less likely to volunteer on a monthly basis (OR 0.40 CI: 0.28, 0.56). In addition, men in full-time self-employment have decreased odds of providing care at the following wave (OR 0.42 CI: 0.28, 0.64), while there is no effect of part-time employment.

Regarding women's within-person estimates (lower panel, table 7-4), prior participation in full-time employment leads to lower odds of providing care at the following wave, after adjusting for potential confounders (OR: 0.66 CI: 0.55, 0.80). In the unadjusted model, this relationship is not present, as it becomes apparent only after adjusting for sociodemographic characteristics. There is also a significant within-person effect also for full-time self-employment (model 1, OR 1.87 CI: 1.21, 2.88), which however is attenuated after adjusting for sociodemographic variables (model 2, OR 1.37 CI: 0.88, 2.13, NS). Between-person estimates show that, on average, women who work full-time have markedly decreased odds of providing informal care (OR: 0.58 CI: 0.42, 0.81).

7.4.2 Does prior paid work affect subsequent provision of more intense informal care provision?

Table 7-5 shows how previous paid work (t_{-1}) affects the likelihood of subsequently providing at least 20 hpw of informal care (t_1), for men (upper panel) and women (lower panel). The results are approximately similar to those observed for table 7-5 (i.e. likelihood of providing any informal care), as within-person estimates show significant results only for full-time employment. Among men, full-time employment leads to lower odds of providing 20hpw of informal care at the following wave, compared to individuals not in work. Between effects for full time employment are also significant, as men in full-time employment are less likely to provide 20 hpw of care. In addition, between effects show that also men who are working in full-time self-employment are on average less likely to provide care

Among women (table 7-5, lower panel), within person estimates show that for a given woman, experiencing full-time employment decreases the odds of providing 20 hpw of care at the following wave (OR: 0.50 CI: 0.36, 0.71), after adjusting for potential confounders. A relationship in the same direction is observed also according to the between-person effect, as women who work full-time are less likely to volunteer on a weekly basis at the following wave (OR: 0.29 CI: 0.18, 0.49).

In addition, there are also significant effects for part-time. Women who work in part-time employment and self-employment, are on average, less likely to provide 20 hpw of informal care.

To summarise, the results presented in tables 7-4 and 7-5, show that for both men and women, prior full-time employment leads to a lower likelihood of providing informal care provision at both low and higher intensity of care. Similarly to what reported for volunteering (chapter eight, section 8.4.2), these relationships support the substitution role hypothesis, as full-time employment seems to compete for the time that individuals may dedicate to informal care activities. The fact that prior full-time work leads to lower odds of providing care, compared to individuals not in work, suggests that individuals need to leave paid work in order to provide informal care provision. Furthermore, we can exclude reverse causality as an explanatory mechanism, since the temporal order of the relationship has been modelled explicitly by lagging the independent variables. Furthermore, the within estimates consider only individuals who change across waves (i.e. exploits the within-person variability), dealing with selection effects. However, also between-person effects are implicated suggesting that selection effects are still important in explaining differences in individuals' engagement in care provision according to employment status.

7.5 Focusing on carers: does paid work affect the intensity of care provided?

Results from the models presented in the previous section examined whether participation in the paid labour market affects men and women's likelihood of engaging in informal care provision. In order to provide further nuance on the relationship between paid work and caregiving, these analyses are extended by restricting the analytical sample to individuals who provided any informal care. This is done to understand whether participation in the paid labour market affects the intensity of care (hours per week) provided. Therefore the results indicate whether paid work affects carers' likelihood of providing 20 or more hours of care per week. In order to model the likelihood of providing more intense care among, the analyses are restricted to all longitudinal observations where respondents report that they provide any amount of care. Therefore, the sample is substantially smaller

compared to previous analyses, as only a minority of the sample provides informal care.

Table 7-6 (upper panel) reports the odds of caring for 20 hpw or more, for male and female carers. The models are analogous to the ones presented in section 7.3 (i.e. the models are not time-lagged), made exception for restricting the sample to observations where individuals reported that they were doing some caregiving. Among male carers, part-time and full-time employment lead to lower odds of providing more intense informal care. Within-person estimate, suggest that also experiencing full-time self-employment decreases the odds of providing more than 20 hours of care per week, although this relationship is partially attenuated and becomes non-significant in the adjusted models. These effects are also observed in the between-person estimates, as male carers who are full-time self-employed, and full-time and part-time employed are on average less likely to provide 20 or more hours of care per week.

The results for women are similar (table 7-6, lower panel). Among female carers, participation in full-time and part-time employment decreases the likelihood of providing 20 or more hours of informal care per week. The relationship remains after controlling for potential confounders. Between effects show negative effects for all forms of paid work that have been considered herein. Compared to individuals who are not in paid work, female carers who work part- and full-time (self)employment, are on average less likely to provide 20 or more hours of care per week. However, the odds ratio for full-time self-employment becomes non-significant after controlling for health characteristics.

Table 7-7 shows the same models with the independent variables lagged ($t-1$), in order to deal with possible reverse causality. These models are analogous to the ones presented in section 7.4, with the exception that the sample is restricted only to carers. The upper panel shows that among male carers, prior full-time employment leads to lower odds of providing 20 hpw of informal care. In the unadjusted model, part-time significantly leads to lower odds of providing more intense care; however, this effect is attenuated and becomes non-significant after controlling for potential confounders. Between-person estimates show male caregivers in full-time self-employment, and part-time and full-time employment are less likely to provide higher intensity of care. The odds ratio for part-time

Table 7-6 Odds of providing 20 hours of care per week among carers; within-between RE models.

	Men							
	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.48	0.13,1.68	0.53	0.15,1.89	0.52	0.14,1.88	0.53	0.15,1.92
SE full -time	0.38*	0.18,0.82	0.46	0.21,1.02	0.53	0.24,1.17	0.52	0.24,1.16
Part-time	0.17***	0.07,0.42	0.18***	0.07,0.46	0.19***	0.07,0.48	0.20***	0.08,0.50
Full-time	0.27***	0.17,0.42	0.32***	0.20,0.53	0.37***	0.22,0.61	0.37***	0.22,0.62
BP - Paid work[a]								
SE part-time	0.09*	0.01,0.94	0.08*	0.01,0.82	0.14	0.01,1.51	0.14	0.01,1.65
SE full -time	0.23***	0.12,0.46	0.21***	0.10,0.44	0.36**	0.18,0.73	0.41*	0.20,0.83
Part-time	0.17**	0.05,0.61	0.15**	0.04,0.56	0.26*	0.07,0.91	0.29	0.08,1.04
Full-time	0.11***	0.07,0.19	0.10***	0.06,0.18	0.16***	0.09,0.30	0.18***	0.10,0.33
N (observations)	5,369							
n (individuals)	1,693							
	Women							
	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.40	0.12,1.33	0.41	0.12,1.36	0.41	0.12,1.36	0.43	0.13,1.43
SE full -time	0.45	0.18,1.17	0.47	0.18,1.20	0.49	0.19,1.25	0.51	0.20,1.32
Part-time	0.43***	0.28,0.64	0.45***	0.30,0.68	0.46***	0.30,0.70	0.49***	0.32,0.74
Full-time	0.38***	0.26,0.54	0.42***	0.28,0.62	0.44***	0.30,0.67	0.45***	0.30,0.67
BP - Paid work[a]								
SE part-time	0.08**	0.02,0.37	0.06***	0.01,0.29	0.10**	0.02,0.46	0.11**	0.02,0.48
SE full -time	0.23**	0.08,0.65	0.18**	0.07,0.52	0.34*	0.13,0.94	0.40	0.15,1.09
Part-time	0.39**	0.22,0.69	0.34***	0.19,0.60	0.39**	0.22,0.69	0.44**	0.25,0.77
Full-time	0.30***	0.20,0.45	0.24***	0.16,0.37	0.36***	0.23,0.55	0.42***	0.27,0.65
N (observations)	8,076							
n (individuals)	2,287							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income; Model 4: model 3+self-rated health and GHQ score. Reference category: [a]no paid work. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: BHPS (waves 1 to 18) and UKHLS (waves 2 to 6). Author's own calculations

Table 7-7 Odds of providing 20 hours of care per week at follow-up among carers; lagged within-between RE models.

	Men							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.13	0.26,4.83	1.29	0.29,5.65	1.24	0.28,5.52	1.25	0.28,5.59
SE full -time	0.39*	0.17,0.94	0.47	0.19,1.17	0.50	0.20,1.23	0.49	0.20,1.22
Part-time	0.62	0.27,1.43	0.73	0.31,1.71	0.74	0.31,1.78	0.76	0.32,1.83
Full-time	0.27***	0.16,0.45	0.30***	0.17,0.53	0.33***	0.19,0.59	0.33***	0.19,0.59
BP - Paid work[a]								
SE part-time	0.21	0.02,2.33	0.16	0.01,1.86	0.55	0.05,5.67	0.57	0.06,5.86
SE full -time	0.15***	0.07,0.35	0.14***	0.06,0.33	0.22***	0.09,0.50	0.23***	0.10,0.53
Part-time	0.23*	0.05,0.95	0.19*	0.04,0.85	0.32	0.08,1.37	0.35	0.08,1.46
Full-time	0.16***	0.09,0.27	0.14***	0.07,0.27	0.22***	0.11,0.41	0.23***	0.12,0.44
N (observations)	4,299							
n (individuals)	1,409							

	Women							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.93	0.26,3.42	0.95	0.26,3.51	0.92	0.25,3.42	0.92	0.25,3.42
SE full -time	0.41	0.14,1.25	0.43	0.14,1.29	0.43	0.14,1.28	0.44	0.14,1.31
Part-time	0.64*	0.41,1.00	0.68	0.43,1.08	0.69	0.43,1.09	0.71	0.45,1.13
Full-time	0.51***	0.34,0.76	0.56**	0.36,0.86	0.57*	0.37,0.88	0.58*	0.37,0.90
BP - Paid work[a]								
SE part-time	0.07**	0.01,0.42	0.06**	0.01,0.35	0.10**	0.02,0.52	0.11**	0.02,0.58
SE full -time	0.35*	0.13,0.98	0.28*	0.10,0.81	0.49	0.18,1.34	0.56	0.20,1.52
Part-time	0.36***	0.20,0.65	0.31***	0.17,0.57	0.37***	0.21,0.67	0.41**	0.23,0.72
Full-time	0.36***	0.23,0.55	0.28***	0.18,0.45	0.41***	0.25,0.65	0.46**	0.29,0.73
N (observations)	6,500							
n (individuals)	1,965							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income; Model 4: model 3+self-rated health and GHQ score. Reference category: [a]no paid work. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: BHPS (waves 1 to 18) and UKHLS (waves 2 to 6). Author's own calculations

employment is reduced after adjusting for socioeconomic characteristics in model 3, as it becomes non-significant.

Among female carers, there is evidence that prior full-time employment leads to lower odds of providing more intense informal care at the following wave, according to the within-person effects. The negative relationship for full-time self-employment is reduced is not significant after controlling for potential confounders. The corresponding between person effects demonstrate significant relationships in the same direction, for part-time self-employment, and part-time and full-time employment, emphasising the importance of selection effects in this relationship.

Overall, results presented in tables 7-6 and 7-7 indicate that full-time, and possibly also part-time, employment directly influence the intensity of care provided by carers. The effect is observed among both men and women and the strength of the effect of part-time employment seems to be weaker in the time-lagged models, suggesting that some reverse causality may affect the relationship. Between-person effects are observed, especially for women, emphasising the importance of considering selection processes and their implications.

7.6 Conclusion

Longitudinal evidence on the relationship between employment status and informal care provision has been presented in this chapter. WB-RE models have been used to provide a nuanced insight into the relationship between paid work and informal care provision. Findings showed that participation in the paid labour market, in particular full-time employment, negatively affects the likelihood of proving informal care. These results are in agreement with previous studies that similarly reported that participation in paid work limits engagement in informal care provision (Carmichael *et al.* 2010; Henz 2006; Robards *et al.* 2015). Similarly to previous studies, the negative relationship between paid work and informal care provision seemed to be even stronger at higher intensities of caregiving (Carmichael *et al.* 2010; Robards *et al.* 2015).

However, the findings presented in this chapter also showed that both between and within person effects were implicated, suggesting that part of the relationship may reflect causal processes, while the other part may be caused by self-selection into caregiving, due to unobserved heterogeneity. For instance, carers who are not in paid work may be more likely to provide care because they have lower

attachment to the paid labour market to begin with. Results also show that separating within and between person effects is particularly important when considering the effect of part-time paid work and self-employment, as these modes of work seem to affect caregiving mostly through between-person estimates.

Nevertheless, these results do not provide an exhaustive understanding of the causal relationship between paid work and caregiving. While longitudinal data can be used to deal with reverse causality, confounding and selection effects, these analyses rely on observational data, which arguably cannot be used to assess causality (see also section 9.3). Another limitation is that logistic models were used, rather than ordinal or multinomial models, which would have enabled a better comparison of the effect of paid work at different intensities of caregiving. Finally, missing data may have affected the results. While the WB-RE models are based on the random effect modelling approach, which is generally deemed to be suitable for the analysis of unbalanced panels with missing data, as it allows the MAR assumption (Carrière & Bouyer 2002; Hu *et al.* 1998; Laird 1988), it is not possible to completely exclude that attrition may have had an impact on the estimates.

Chapter 8

The longitudinal relationship between paid work and volunteering

8.1 Introduction

This chapter examines the effect of paid work on engagement in volunteering among older adults, answering the overarching question: does participation in the paid labour market limit engagement in volunteering in mid-to later life? In order to understand how employment status affects volunteering in the years preceding and following SPA, The longitudinal relationship between participation in paid work and volunteering is investigated, examining also whether prior participation in paid work affects subsequent volunteering, and the frequency of volunteering.

As discussed in the literature review (chapter three, section 3.5.2) it is unclear whether paid work and volunteering are competing or complementary activities for older adults. Most of the studies on the interrelationship between paid work and volunteering among older adults are cross-sectional in nature, and report mixed findings, with some studies reporting no association at all (e.g. Chambré 1984; Caro & Bass 1997; Herzog & Morgan 1993; Choi 2003; Carr & Kail 2013) and with others showing a higher probability of engaging in volunteering among older adults who are not in paid work (Dosman *et al.* 2006; Hank & Erlinghagen 2009a; Mutchler *et al.* 2003; van den Bogaard *et al.* 2014b).

Previous research seems to suggest working part-time or fewer hours is associated with more frequent volunteering (Carr & Kail 2012; Choi & Chou 2010; Dosman *et al.* 2006). Furthermore, individuals who have more flexible working arrangements, such as those who are self-employed, may combine volunteering and paid work more effectively (Freeman 1996; Thompson 1993a, 1993b). However, little research has examined this in large longitudinal samples, and among older adults.

Pitfalls of previous research include: the lack of longitudinal evidence; clarity regarding whether self-employment, part-time and full-time paid work affect engagement in volunteering differently; focusing on older adults; distinguishing frequency of volunteering; ambiguity regarding selection effects (Wilson 2012) (e.g. self-selection due to past experiences in volunteering, personality traits and values); and research investigating gender differences.

In order to further current knowledge on the relationship between paid work and volunteering, the following research questions are addressed (see chapter four, section 4.7.1, for a more detailed outline of the objectives and research questions):

1. What are the sociodemographic, and health characteristics of volunteers in the 55 to 70 age group, and how do they differ from those who do not engage in volunteering? (section 8.2)
2. What is the longitudinal relationship between participation to the paid labour market (out of work, part-time and full-time self-employment, and part-time and full-time employment) and engagement in volunteering in mid to later life, and are there differences by gender? (section 8.3)
3. Does prior paid work status affect engagement in volunteering at the following observation point, and are there differences by gender? (section 8.4)
4. Does paid work affect the likelihood of volunteering on at least a weekly basis among individuals who volunteer at least monthly? Are these relationships similar for men and women? (section 8.5)

Overall, the findings presented in this chapter show that employment has a negative effect on volunteering, particularly for women. Among women, part-time work and self-employment also seem to affect engagement in volunteer work. For men it seems that only being in full-time employment consistently limits engagement in volunteering. In addition, changes in paid work status affect subsequent volunteering, and taking-up volunteering.

The following section (8.2), describes the characteristics of the analytical sample of men and women aged 55 to 70, and explores the bivariate relationships between volunteering and paid work, demographic characteristics, socioeconomic status, and health. Descriptive statistics use the baseline information for each respondent. Sections 8.3 to 8.5 present the multivariate analyses that directly answer the research questions outlined in chapter four (section 4.7.1). The logistic WB-RE models, also known as hybrid models, show the relationship between paid work and engagement in volunteering. The analyses focus on two different outcomes: engagement in volunteering on a (at least) monthly basis; and volunteering on (at least) a weekly basis. Results in section 8.3, show the contemporaneous relationship between paid work and volunteering. Section 8.4 examines the prospective relationship between paid work and subsequent engagement in volunteering, in order to address any potential reverse causality that may drive a spurious association in the contemporaneous relationship. Section 8.5 further analyse the relationship between paid work and volunteering by examining

whether paid works affects frequency of volunteering among volunteers, i.e. the analyses is restricted only to volunteers.

8.2 Baseline characteristics of volunteers

Cross-sectional descriptive statistics are presented in table 8-1, showing the bivariate relationships between volunteering and all other independent variables, at the baseline observation for each individual. Chi square tests and ANOVAs show the statistical significance of each bivariate relationship. The analysis in this section uses only information from the baseline measurement from each one of the 6,867 respondents aged 55 to 70 included in the main analytical sample used in the models in section 8.3; this is different from using only the first wave of the BHPS (1996) as the baseline. The information used here is the first complete case from any wave of the BHPS and UKHLS for each individual who was included in the analytical sample.

Descriptive results in table 8-1 show that while most of the sample reported that they were not volunteering on at least a monthly basis (86%) at baseline, 355 participants (5%) engaged in volunteer work at least monthly but less than weekly, and 607 (9%) volunteered on a weekly basis or more frequently. Engagement in volunteer work is significantly associated with paid work ($p<0.001$), as volunteers are broadly less likely to work full-time and more likely to be out of paid work, and they are more likely to work in part-time and self-employment. Moreover, more non-volunteers participate in full-time employment (36.3%) compared to both monthly and weekly volunteers (29% and 26%). More weekly volunteers are not in paid work (56.8%) compared to non-volunteers (49%) and monthly volunteers (48.5%). This broadly corroborates other studies showing that volunteers who are not in employment are more likely to dedicate more time to volunteering (Caro & Bass 1997; Chambré 1984). Among monthly volunteers, more individuals work as part-time employees (10%) and as full-time self-employed (10.4%). In comparison to monthly (2%) and weekly volunteers (2%), fewer non-volunteers (1%) report working as part-time self-employed.

Table 8-1 also shows that volunteering is significantly associated with paid work, gender, birth decade (cohort), highest education attained, tenure status, income quintiles, subjective financial situation, wellbeing (GHQ score) and

Table 8-1 Descriptive statistics associations at each respondent's baseline, N=6867.

		Percentage or Mean (SD)		
		Volunteering		
Variables	Full sample	None or rarely	At least Monthly	At least Weekly
Paid Work, p < 0.001				
Out of paid work	49.7%	49%	48.5%	56.8%
Self-employed part-time	1%	0.9%	1.7%	2%
Self-employed full -time	7.9%	7.8%	10.4%	7.7%
Part-time employment	6.4%	6.1%	10.4%	7.4%
Full-time employment	35.0%	36.3%	29.0%	26.0%
Gender, p = 0.001				
Male	46.3%	47.2%	41.4%	40.4%
Female	53.7%	52.8%	58.6%	59.6%
Age, p = 0.057				
Mean (SD)	59.2 (4.7)	59.1 (4.7)	59.5 (4.9)	59.5 (4.8)
Birth decade, p = 0.024				
<1920	5.7%	5.3%	8.5%	7.3%
1930-1939	29.6%	29.2%	30.7%	32.6%
1940-1949	39.4%	39.8%	38.0%	36.2%
1950-1959	25.4%	25.7%	22.8%	23.9%
Marital Status, p = 0.448				
Married/partnered	71.5%	71.2%	74.7%	71.7%
Divorced/separated	13.0%	13.3%	10.7%	11.2%
Widowed	8.5%	8.4%	8.7%	9.1%
never married/partnered	7.1%	7.0%	5.9%	8.1%
Education level, p < 0.001				
High/Post-secondary	19.4%	17.1%	33.2%	33.6%
Intermediate	46.4%	46.3%	48.5%	46.8%
No qualification	34.1%	36.6%	18.3%	19.6%
Tenure (Modal), p < 0.001				
Owned	48%	46.4%	61.4%	55.4%
Mortgage	30.2%	30.7%	26.5%	26.9%
Renting	21.8%	22.9%	12.1%	17.8%
Income quintiles, p < 0.001				
First (highest)	20.9%	20%	29.0%	25.5%
Second	19.7%	19.6%	22.8%	19.1%
Third	18.2%	18.5%	16.3%	17%
Fourth	21.4%	22%	17.2%	18.5%
Fifth (Lowest)	19.8%	20.1%	14.7%	19.9%
Subjective finances, p < 0.001				
Living comfortably/alright	66.6%	65.3%	76.6%	73.3%
Getting by/difficult	33.4%	34.7%	23.4%	26.7%
GHQ score, p < 0.001				
Mean (SD)	11.3 (5.5)	11.5 (5.6)	10.6 (4.5)	10.4 (4.8)
Self-rated health (%), p < 0.001				
Excellent/Good	64%	62.6%	74.7%	70.8%
Fair/poor/very poor	36%	37.4%	25.4%	29.2%
Total				
Percentage, %	100%	86%	5.2%	8.8%
Frequency, n	6867	5905	355	607

Notes: only the baseline for each individual is considered herein, i.e. only the first recorded observation for each person in the available waves from the BHPS and UKHLS are used. P-values for the relationship between volunteering and other variables were obtained using a Chi-square test for categorical variables, and ANOVA for continuous variables.
PT: part-time; FT: full-time; SD: standard deviation; HH: household. * p < 0.05, ** p < 0.01, *** p < 0.001.
Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18) and UKHLS (waves 2, 4, 6). Author's own calculations.

self-rated health. The distribution of volunteering by gender shows that more women volunteered monthly (58.6%) and weekly (59.6%), than men. Birth cohort differences seem to show a gradient whereby individuals from older cohorts are more likely to volunteer, which is in accordance with previous literature that detects a generational decline in volunteering (McCulloch 2014). A clear gradient for education is observed, as volunteers have higher levels of education: among monthly and weekly volunteers 18 % and 20%, respectively, have no qualifications, as opposed to 37% among non-volunteers; around 33% of those who volunteer monthly and weekly have post-secondary education, while only 17% do so among non-volunteers. Other measures of socioeconomic status also show that volunteers are more likely to be better-off, i.e. homeowners, higher income, no subjective reports of financial problems. Non-volunteers have on average a worse mental health score as measured by the GHQ, and are more likely to report poorer self-rated health (37%). Finally, table 8-1 shows that there is no significant bivariate relationship between volunteering and marital status, and only weak evidence of a relationship with age (p=0.057).

8.3 Multivariate relationship between paid work and volunteering: decomposing within and between effects

8.3.1 Is paid work related to monthly volunteering?

Table 8-2 shows the relationship between paid work and volunteering on a monthly basis for men and women. In the same fashion as chapter seven, WB-RE models were used to distinguish the effect that is due to differences between individuals (averaged effect) from that within individuals over time (subject specific). While the former effect reflects the portion of the relationship that is caused by unobserved characteristics and selection effects, the latter enables to draw a better causal inference, since within-person estimates which are analogous to FE model estimates whereby each individual acts as her/his own control.

For each gender, four models are presented in Table 8-2: model 1 shows the bivariate unadjusted estimates; model 2 controls for demographic characteristics (age, age squared, birth decade and marital status); model 3 also adjusts for socioeconomic variables (highest level of education attained, modal housing tenure, subjective financial circumstances, and income quintiles); and model 4 further controls for health (GHQ mental health score and self-rated health). The outcome is

the binary variable that indicates whether individuals volunteer at least on a monthly basis. Odds ratios and significance levels are reported in all the tables in this and the following sections.

Table 8-2 (left-hand panel) shows that men in in full time employment are less likely to volunteer on a monthly basis, both with respect to between and within effects, compared to those who are not in employment. Within estimates show that for a given individual, full time employment leads to a lower likelihood of engaging in volunteering at least monthly. This effect remains mostly unaltered after adjusting for all covariates in model 4 (OR: 0.42 CI: 0.29, 0.61). Therefore, this suggests that for individuals who changed employment status between the ages of 55 to 70, being in full-time rather than out of work is associated with lower odds of monthly volunteering. The within effects for part-time and self-employment are weak and non-significant.

The averaged between effect for full-time employees becomes significant after adjusting for socioeconomic variables and health in model 4: on average, men who work full-time have significantly lower odds of volunteering at least monthly compared to those who are out of work (OR: 0.49, CI: 0.28, 0.83). Between effects show also significant effects for part-time employment and part-time self-employment. The fact that between, but not within effects are observed for these modes of employment, suggests that any difference in monthly volunteering is due to selection effects. On average, men who work in part-time have a markedly increased likelihood of volunteering (model 2, OR: 7.7 CI: 2.61, 22.71); however, these effects are considerably reduced after controlling for socioeconomic factors in model 3 (OR: 3.97, CI: 1.33, 11.84) and health in model 4 (OR: 3.19, CI: 1.07, 9.56). Those who are part-time self-employed have substantially raised odds of volunteering monthly (model 2, OR: 22.67 CI: 3.38, 152.04); however, this effect is partially attenuated after controlling for socioeconomic status and health (OR: 7.88 CI: 1.20, 51.67). The wide confidence intervals for these estimates are likely driven by the relative rarity of part-time employment and part-time self-employment among men. The large impact of controlling for socioeconomic variables and health on estimates for volunteering is to be expected given the importance of human capital and health as determinants of engagement in volunteering (Li & Ferraro 2006; Wilson & Musick 1998).

Table 8-2 - Odds of volunteering at least on a monthly basis; within-between random effects models.

	Men								Women							
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]																
SE part-time	1.06	0.48, 2.35	1.10	0.50, 2.44	1.02	0.46, 2.23	0.98	0.44, 2.15	0.77	0.39, 1.52	0.77	0.39, 1.52	0.77	0.39, 1.51	0.75	0.38, 1.48
SE full -time	0.68	0.42, 1.12	0.81	0.48, 1.35	0.71	0.43, 1.20	0.71	0.42, 1.20	0.31**	0.15, 0.63	0.31**	0.15, 0.64	0.30***	0.14, 0.61	0.29***	0.14, 0.60
Part-time	0.96	0.56, 1.66	1.04	0.60, 1.80	0.94	0.54, 1.62	0.92	0.53, 1.59	0.77	0.55, 1.09	0.79	0.55, 1.12	0.75	0.53, 1.07	0.74	0.52, 1.06
Full-time	0.43***	0.32, 0.59	0.52***	0.36, 0.73	0.42***	0.29, 0.61	0.42***	0.29, 0.61	0.32***	0.24, 0.43	0.33***	0.24, 0.45	0.30***	0.22, 0.42	0.31***	0.22, 0.43
BP - Paid work[a]																
SE part-time	22.18**	3.30,148.98	22.67**	3.38,152.04	9.04*	1.39,58.67	7.88*	1.20,51.67	8.66**	2.28, 2.95	9.41**	2.46, 5.98	4.33*	1.18, 5.86	3.85*	1.05,14.11
SE full -time	1.30	0.74, 2.27	1.51	0.84, 2.73	1.13	0.61, 2.09	0.95	0.51, 1.76	2.23	0.96, 5.19	2.42*	1.03, 5.69	1.18	0.51, 2.76	0.98	0.42, 2.28
Part-time	7.16***	2.43, 21.09	7.70***	2.61, 22.71	3.97*	1.33,11.84	3.19*	1.07, 9.56	1.19	0.68, 2.09	1.30	0.73, 2.30	1.05	0.58, 1.89	0.91	0.51, 1.64
Full-time	0.72	0.47, 1.09	0.86	0.53, 1.38	0.59	0.35, 1.00	0.49**	0.28, 0.83	0.33***	0.22, 0.50	0.39***	0.25, 0.61	0.24***	0.15, 0.38	0.20***	0.12, 0.32
Age	-		1.12	0.62, 2.00	1.14	0.64, 2.03	1.09	0.61, 1.94	-							
Age squared	-		1.00	0.99, 1.00	1.00	0.99, 1.00	1.00	0.99, 1.00	-		0.93	0.58, 1.50	0.89	0.55, 1.43	0.82	0.51, 1.32
Birth decade[b]																
1930-1939	-		1.17	0.51, 2.66	0.91	0.38, 2.13	0.98	0.41, 2.31	-		0.68	0.35, 1.31	0.52	0.27, 1.01	0.53	0.27, 1.02
1940-1949	-		0.90	0.39, 2.11	0.63	0.26, 1.51	0.68	0.28, 1.65	-		0.64	0.33, 1.24	0.43*	0.22, 0.84	0.45*	0.23, 0.88
1950-1959	-		1.19	0.47, 3.02	0.76	0.29, 1.99	0.80	0.30, 2.12	-		0.54	0.26, 1.12	0.28***	0.13, 0.58	0.29**	0.14, 0.61
Marital status[c]																
Divorced	-		0.92	0.58, 1.44	1.01	0.63, 1.62	1.03	0.64, 1.66	-		0.95	0.67, 1.34	1.19	0.83, 1.70	1.24	0.86, 1.78
Widowed	-		0.90	0.49, 1.66	0.98	0.52, 1.86	0.98	0.51, 1.85	-		0.92	0.66, 1.29	1.05	0.75, 1.47	1.11	0.79, 1.56
Never married	-		0.81	0.46, 1.43	1.08	0.59, 1.97	1.10	0.60, 2.00	-		1.62	0.96, 2.76	1.43	0.83, 2.45	1.40	0.81, 2.40
Education level[d]																
Intermediate	-		-		0.22***	0.15, 0.32	0.23***	0.16, 0.34	-		-		0.26***	0.19, 0.36	0.27***	0.20, 0.38
No qualification	-		-		0.05***	0.03, 0.09	0.06***	0.03, 0.10	-		-		0.06***	0.04, 0.10	0.07***	0.05, 0.10
Modal tenure status[e]																
Mortgage	-		-		0.49***	0.33, 0.73	0.50***	0.34, 0.75	-		-		0.67*	0.48, 0.94	0.70*	0.50, 0.98
Renting	-		-		0.48**	0.29, 0.78	0.51**	0.31, 0.83	-		-		0.54**	0.37, 0.79	0.60**	0.42, 0.88
Income quintiles[f]																
Second	-		-		1.09	0.81, 1.46	1.08	0.80, 1.46	-		-		0.92	0.71, 1.19	0.89	0.69, 1.16
Third	-		-		0.73	0.52, 1.01	0.73	0.52, 1.01	-		-		0.79	0.60, 1.04	0.78	0.59, 1.03
Fourth	-		-		0.61**	0.42, 0.89	0.62*	0.43, 0.90	-		-		0.89	0.66, 1.19	0.89	0.67, 1.20
Fifth (lowest)	-		-		0.70	0.46, 1.05	0.71	0.47, 1.07	-		-		0.78	0.57, 1.07	0.77	0.56, 1.06
Subjective finances[g]																
Finding it difficult	-		-		1.01	0.78, 1.31	1.08	0.83, 1.40	-		-		0.85	0.69, 1.04	0.94	0.77, 1.16
Self-rated health[h]																
fair/poor	-		-		-		0.59***	0.45, 0.76	-		-		-		0.63***	0.52, 0.78
GHQ score	-		-		-		0.98	0.96, 1.00	-		-		-		0.96***	0.94, 0.97
N (observations)				10,836								13,029				
n (individuals)				3,177								3,690				

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income quintiles; Model 4: model 3+self-rated health and GHQ score. Reference categories: [a]no paid work, [b]1929 or earlier, [c]married or cohabiting, [d]high/post-secondary, [e]homeowner, [f]first (highest), [g]living comfortably/doing alright, [h]excellent/good. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * p < 0.05, ** p < 0.01, *** p < 0.001

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18) and UKHLS (waves 2, 4, 6). Author's own calculations.

Table 8-2 (right-hand panel) shows the odds of engaging in monthly or more frequent volunteering for women. Similar to men, full-time employment is associated with lower odds of volunteering, according to both within and between effects. On average, women who are active in full-time paid employment have lower odds of engaging in volunteering (OR 0.20 CI: 0.12,0.32) than women who are not in employment. Within estimates show that a given woman in full-time employment is less likely to engage in volunteering even after accounting for all covariates (OR 0.31 CI: 0.22, 0.43).

Similar to men, on average, part-time self-employed women have higher odds of volunteering monthly (model 2, OR 9.41 CI: 2.46, 5.98), although the strength of this association is reduced after controlling for socioeconomic factors and health in model 4 (OR 3.85 CI: 1.05, 14.11). By contrast, the subject specific estimates show that women in full-time self-employment have lower odds of engaging in volunteering, even after adjusting for all the covariates (OR 0.54 CI: 0.31,0.92). This shows the importance of differentiating the effect of part-time and full-time work also among those who are self-employed.

Regarding the other covariates (table 8-2), there is an evident educational gradient for both men and women: individuals who hold post-secondary education degrees are more likely to engage in monthly volunteering than those with intermediate education levels and, even more so, than those without any qualifications. Homeowners also seem to be more likely to volunteer compared to renters and individuals with mortgages. Compared with people in the top income quintile, those who are in the lower income quintiles have lower odds of volunteering, although there is a significant effect only for men in the fourth quintile. Reporting poorer self-rated health is associated with lower odds of volunteering for both men and women, while among women a higher GHQ score (i.e. worse wellbeing and mental health) is associated with lower odds of monthly volunteering. As any given individual is less likely to volunteer if reporting poorer health, simultaneously volunteers may be more likely to have better health due to the health enhancing positive effects of volunteering (Li and Ferraro 2006).

Overall, results in table 8.2 show that full-time employment, for both men and women, is negatively associated with volunteering through both subject specific and averaged effects. This shows that while part of this relationship may be caused by selection effects and unobserved confounding (the between effects), the rest of

the relationship is mediated through direct influences of full-time employment on volunteering. Regarding part-time paid work and self-employment, the relationships are not consistent across subject specific and the averaged effects. This highlights the importance of decomposing between and within-person effects, as, for example, selection effects may have diluted the negative relationship between full-time self-employment and monthly volunteering, which is observed only through within effects.

8.3.2 Is paid work related to weekly volunteering?

Table 8-3 shows the odds of volunteering weekly or more frequently estimated with the WB-RE logistic model by gender. The relationship between paid work status and weekly volunteering among men broadly resembles that observed for monthly volunteering (table 8-2). Within estimates for full-time employment show that for any given man in our sample, working full-time leads to lower odds of weekly volunteering (OR 0.36 CI: 0.24, 0.55). The effect is consistent across all four models in table 8-3 (left-hand panel). Considering the between estimates, on average, men who are participating in full-time employment have lower odds of volunteering weekly in the fully adjusted model (OR 0.40 CI: 0.23, 0.72).

The effect of men's part-time employment on volunteering is more complex, as within and between effects seem to show associations in opposite directions. The relationship at the within effects level, albeit not-statistically significant, is negative in all four models (OR 0.68 CI: 0.37,1.24 N.S.). The between person effects show instead that on average men who work part-time are much more likely to volunteer (model 3, OR 3.35 CI: 1.11, 10.13), although the association is attenuated after controlling for health (model 4, OR 2.68 CI: 0.88, 8.14, N.S.). This suggests that previous findings reporting that part-time employment is conducive to volunteering (Choi 2003; Dosman et al. 2006; Carr & Kail 2013), may be affected by selection effects, as individuals working part-time may also have a higher tendency to engaging in volunteering as they self-select themselves in part-time employment, possibly due to personal characteristics (Lancee & Radl 2014).

For women, the estimates for weekly volunteering (table 8-3, left-hand panel) are noticeably different compared to the ones for monthly volunteering. Within effects for employment status show that experiencing full-time self-employment, part-time and full-time employment, all lead to lower odds of

Table 8-3. Odds of volunteering on weekly basis or more; within-between random effects models.

	Men								Women							
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]																
SE part-time	0.92	0.39,2.15	0.96	0.41,2.25	0.89	0.38,2.07	0.87	0.37,2.01	0.52	0.24,1.14	0.52	0.24,1.15	0.53	0.24,1.16	0.50	0.23,1.10
SE full -time	0.79	0.45,1.38	0.94	0.52,1.69	0.85	0.47,1.53	0.87	0.48,1.56	0.12***	0.05,0.28	0.12***	0.05,0.30	0.13***	0.05,0.30	0.12***	0.05,0.29
Part-time	0.67	0.37,1.21	0.75	0.41,1.36	0.69	0.38,1.25	0.68	0.37,1.24	0.45***	0.30,0.68	0.48***	0.32,0.73	0.48***	0.32,0.73	0.48***	0.31,0.72
Full-time	0.33***	0.23,0.46	0.42***	0.28,0.63	0.36***	0.24,0.55	0.36***	0.24,0.55	0.23***	0.16,0.32	0.26***	0.17,0.38	0.26***	0.17,0.38	0.26***	0.17,0.38
BP - Paid work[a]																
SE part-time	12.26**	1.96,76.75	11.76**	1.87,73.93	5.59	0.85,36.92	4.84	0.73,32.06	3.46	0.88,13.51	3.74	0.95,14.67	2.19	0.55,8.71	1.97	0.50,7.80
SE full -time	0.87	0.45,1.66	0.83	0.42,1.65	0.63	0.32,1.26	0.53	0.26,1.06	0.96	0.36,2.51	1.00	0.37,2.65	0.57	0.21,1.53	0.50	0.19,1.33
Part-time	5.77**	1.98,16.85	5.96**	2.03,17.49	3.35*	1.11,10.13	2.68	0.88,8.14	0.80	0.42,1.54	0.86	0.45,1.67	0.73	0.37,1.43	0.65	0.33,1.28
Full-time	0.73	0.45,1.17	0.69	0.40,1.18	0.49*	0.28,0.87	0.40**	0.23,0.72	0.30***	0.18,0.48	0.34***	0.20,0.56	0.24***	0.14,0.41	0.21***	0.12,0.35
Age	-		1.63	0.84,3.17	1.62	0.84,3.13	1.53	0.79,2.96	-							
Age squared	-		1.00	0.99,1.00	1.00	0.99,1.00	1.00	0.99,1.00	-		1.39	0.80,2.42	1.31	0.76,2.28	1.24	0.71,2.15
Birth decade[b]											1.00	0.99,1.00	1.00	0.99,1.00	1.00	0.99,1.00
1930-1939	-		1.72	0.60,4.93	1.41	0.51,3.92	1.53	0.55,4.25	-							
1940-1949	-		2.06	0.71,6.01	1.50	0.53,4.26	1.64	0.58,4.67	-		0.74	0.36,1.51	0.59	0.29,1.21	0.60	0.29,1.23
1950-1959	-		2.94	0.93,9.26	1.99	0.64,6.16	2.11	0.68,6.54	-		0.78	0.37,1.60	0.56	0.27,1.17	0.58	0.28,1.22
Marital status[c]											0.75	0.33,1.68	0.44*	0.19,0.99	0.46	0.20,1.04
Divorced	-		0.88	0.52,1.46	0.96	0.57,1.61	0.99	0.59,1.66	-							
Widowed	-		0.92	0.46,1.81	1.02	0.51,2.03	1.02	0.51,2.03	-		1.00	0.68,1.47	1.17	0.78,1.74	1.20	0.81,1.80
Never married	-		0.80	0.42,1.51	1.02	0.53,1.95	1.03	0.54,1.98	-		1.02	0.71,1.48	1.11	0.77,1.62	1.17	0.80,1.70
Education level[d]											2.01*	1.15,3.53	1.74	0.98,3.10	1.71	0.96,3.04
Intermediate	-		-		0.25***	0.17,0.37	0.25***	0.17,0.38	-		-					
No qualification	-		-		0.07***	0.04,0.13	0.08***	0.05,0.14	-		-		0.32***	0.23,0.46	0.33***	0.24,0.48
Modal tenure status[e]													0.09***	0.06,0.15	0.10***	0.07,0.16
Mortgage	-		-		0.62*	0.40,0.95	0.63*	0.41,0.98	-		-					
Renting	-		-		0.62	0.36,1.07	0.67	0.39,1.15	-		-		0.69	0.47,1.00	0.71	0.49,1.04
Income quintiles[f]													0.70	0.46,1.05	0.77	0.51,1.15
Second	-		-		1.10	0.79,1.54	1.12	0.80,1.56	-		-					
Third	-		-		0.79	0.54,1.14	0.80	0.55,1.16	-		-		0.83	0.61,1.12	0.82	0.60,1.11
Fourth	-		-		0.74	0.49,1.10	0.76	0.51,1.14	-		-		0.90	0.66,1.24	0.90	0.65,1.23
Fifth (lowest)	-		-		0.72	0.45,1.14	0.74	0.47,1.18	-		-		1.05	0.75,1.46	1.06	0.76,1.47
Subjective finances[g]													0.88	0.61,1.26	0.87	0.61,1.25
Finding it difficult	-		-		1.02	0.76,1.37	1.10	0.81,1.48	-		-					
Self-rated health[h]													0.89	0.70,1.12	0.99	0.78,1.25
fair/poor	-		-		-		0.98	0.95,1.01	-		-		-		0.73**	0.58,0.92
GHQ score	-		-		-		0.54***	0.41,0.73	-		-		-		0.95***	0.93,0.97
N (observations)	10,836								13,029							
n (individuals)	3,177								3,690							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income quintiles; Model 4: model 3+self-rated health and GHQ score. Reference categories: [a]no paid work, [b]1929 or earlier, [c]married or cohabiting, [d]high/post-secondary, [e]homeowner, [f]first (highest), [g]living comfortably/doing alright, [h]excellent/good. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * p < 0.05, ** p < 0.01, *** p < 0.001

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18) and UKHLS (waves 2, 4, 6). Author's own calculations.

volunteering on a weekly basis compared to being out of work. These effects are consistent across all four models. These findings show that participation in any form of employment, with the exception of part-time self-employment where the estimates are not statistically significant (OR 0.50 CI: 0.23, 1.10), limits women's engagement in weekly volunteering. Furthermore, between effects show that on average, women who are in full-time employment are less likely to volunteer on a weekly basis (OR 0.21 CI: 0.12, 1.35).

Other covariates show similar effects to that observed for monthly volunteering. For both men and women there is an education gradient, whereby those with lower levels of education are less likely to engage in volunteering. Homeowners are more likely to volunteer on a weekly basis – although this effect is not statistically significant for women. People who report poor or very poor health are less likely to volunteer. Among women, worse mental health is associated with lower odds of volunteering. To recap, among men, full-time employment leads to lower engagement in volunteering on a weekly basis. However, for women any form of employment leads to lower volunteering on a weekly basis.

8.4 Prospective relationship between paid work and subsequent volunteering: lagged within-between random effects models

The results from the previous section have shown that full-time paid work leads both men and women to a lower likelihood of volunteering monthly and weekly, and this effect is driven by both within and between variability, indicating that both selection effects and direct causal influences may be playing a role (tables 8-2, 8-3). Those who work part-time seem to be more likely to volunteer, albeit this average effect is likely to be driven by unobserved confounders or selection effects (tables 8-2 and 8-3). Among women, full-time self-employment, part-time and full-time employment lead to lower odds of volunteering on a weekly basis through within-person estimates, after controlling for confounders, providing strong evidence showing that employment and volunteering are competing activities (table 8-3).

However, although within-person estimates consider only within-person variability, these results do not give a definitive indication as to whether prior paid work status might subsequently lead individuals to a higher or lower probability of

volunteering. Although the models used in the previous sections account for the longitudinal nature of the data, they do not explicitly model the temporal order of the effect of employment on volunteering. Therefore, reverse causality mechanisms may affect the relationships reported in the previous section.

In this section, the prospective relationship between employment status and volunteering is investigated, in order to answer the research question: does prior employment affect subsequent volunteering? The results show how paid work from the previous wave affects engagement in volunteering at the following wave (There is a two years gap between the waves as information on volunteering is available only at every other wave). The lagged models provide better evidence to make causal inference, as they explicitly model the temporal order of the relationship of interest. In these analyses, the overall sample is reduced, compared to models in the previous section, as only individuals who have provided information over two consecutive waves are included, and every individual loses one year of information due to the effect of "lagging" the independent variables.

8.4.1 Does prior paid work affect subsequent monthly volunteering?

Table 8-4 shows the effect of prior employment (t_{-1}) on subsequent monthly volunteering (t_1), for men (upper panel) and women (lower panel). Within estimates show that among men, prior full-time self-employment and part-time and full-time employment all lead to lower odds of volunteering at follow-up, compared to being out of the paid labour market. The size of the relationships remains broadly unchanged after adjusting for potential confounders. Similar to models presented in the previous section, the effect of full-time employment is driven by both between and within person variability, as on average men in full-time employment are less likely to volunteer on a monthly basis (OR 0.49 CI: 0.27, 0.88). In addition, men in part-time self-employment have raised odds of volunteering at the later wave, while the effect of part-time paid work is attenuated after adjusting for socioeconomic characteristics (OR 2.60 CI: 0.76, 8.88, N.S.).

Regarding women's within-person estimates (table 8-4), participating in full-time paid work leads to lower odds of volunteering, after adjusting for potential confounders (OR: 0.49 CI: 0.32, 0.76). The between effects estimate shows a similar relationship, as on average women who work full-time have markedly decreased odds of volunteering (OR: 0.39 CI: 0.23, 0.65). Conversely, self-employed

Table 8-4 Odds of monthly volunteering and changes in employment status; lagged within-between random effects models.

	Men							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.34	0.42, 4.29	1.42	0.44, 4.52	1.21	0.39, 3.76	1.21	0.39, 3.77
SE full -time	0.47*	0.23, 0.95	0.53	0.26, 1.11	0.46*	0.22, 0.95	0.46*	0.22, 0.97
Part-time	0.45	0.20, 1.02	0.48	0.21, 1.08	0.42*	0.19, 0.95	0.42*	0.19, 0.95
Full-time	0.44***	0.28, 0.69	0.50**	0.30, 0.82	0.41***	0.25, 0.69	0.42**	0.25, 0.71
BP - Paid work[a]								
SE part-time	68.01**	5.02, 921.81	65.46**	4.91, 873.5	24.46**	2.17, 275.82	24.08*	2.10, 276.56
SE full -time	1.47	0.78, 2.76	1.51	0.78, 2.91	1.17	0.60, 2.30	1.12	0.57, 2.21
Part-time	5.49**	1.60, 18.79	5.94**	1.73, 20.39	2.60	0.76, 8.88	2.36	0.69, 8.08
Full-time	0.76	0.47, 1.24	0.79	0.46, 1.36	0.52*	0.29, 0.93	0.49*	0.27, 0.88
N (observations)				5,964				
n (individuals)				2,279				
	Women							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.40	0.53, 3.68	1.46	0.55, 3.84	1.43	0.54, 3.76	1.44	0.55, 3.80
SE full -time	0.49	0.17, 1.36	0.53	0.19, 1.50	0.49	0.17, 1.39	0.50	0.18, 1.43
Part-time	0.78	0.50, 1.24	0.82	0.51, 1.32	0.77	0.48, 1.24	0.77	0.48, 1.23
Full-time	0.47***	0.32, 0.69	0.53**	0.34, 0.81	0.48**	0.31, 0.75	0.49**	0.32, 0.76
BP - Paid work[a]								
SE part-time	5.81*	1.11, 30.29	6.84*	1.30, 36.07	3.02	0.61, 15.12	2.86	0.58, 14.09
SE full -time	3.83**	1.41, 10.38	4.77**	1.73, 13.12	2.50	0.92, 6.77	2.33	0.86, 6.28
Part-time	1.45	0.78, 2.67	1.71	0.91, 3.20	1.37	0.72, 2.59	1.30	0.69, 2.46
Full-time	0.51**	0.32, 0.80	0.66	0.41, 1.08	0.41***	0.24, 0.69	0.39***	0.23, 0.65
N (observations)				7,250				
n (individuals)				2,708				

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income; Model 4: model 3+self-rated health and GHQ score. Reference category: [a]no paid work. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18) and UKHLS (waves 2, 4, 6). Author's own calculations.

women, both full-time and part-time, have higher odds of volunteering, although the effect is attenuated and becomes non-significant after adjusting for socioeconomic characteristics and health, in models 3 and 4.

The fact that prior full-time work leads to lower odds of volunteering, compared to individuals not in work, may agree with the substitution perspective, as individuals who are out of, or leave, paid work, are more likely to have spare time to volunteer. The resource perspective, which posits that individuals with more social and human capital are more likely to volunteer, may explain the fact that self-employed and part-time workers are more likely to volunteer according to between estimates. These individuals may be self-selected into volunteering due participation in the labour market, which provides networks and connections, and at the same time they may have more time for volunteering due to more flexible work schedules.

8.4.2 Does prior paid work affect subsequent weekly volunteering?

Table 8-5 shows how previous paid work (t_{-1}) affects the likelihood of subsequent weekly or more frequent volunteering at follow-up (t_1), for men (upper panel) and women (lower panel). Within estimates show that, among men, both being in part-time (OR: 0.40 CI: 0.17, 0.95) and full-time (OR: 0.46 CI: 0.26, 0.81) employment lead to lower odds of volunteering weekly, compared to individuals not in work. By contrast, between effects suggest that men working in part-time employment are on average more likely to volunteer on a weekly basis (model 3, OR: 3.72 CI: 1.16, 11.96), although the relationship is attenuated when controlling for health variables (model 4, OR: 3.14 CI: 0.97, 10.19). The divergence among the within and the between person estimates, emphasises the importance of disentangling the portions of the relationship caused by the two types of variability. In a traditional RE model these two opposing effects would have cancelled each other out, while in a fixed effect model the associations that are due to between variability would have been overlooked. While it may be argued that only the within estimates reflects a causal relationship, the averaged, between effects are still of considerable interest for policy considerations – as argued in chapter nine, section 9.4.

Between effects also show that part-time self-employed men are much more likely to volunteer on a weekly basis (OR: 23.32 CI: 2.31, 235.57). The large confidence intervals may be a result of the relative number of men who are in part-time self-employment, as the sample of the lagged models is further reduced. The

Table 8-5 Odds of weekly volunteering and changes in employment status; lagged within-between random effects models.

Men								
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.58	0.51,4.89	1.70	0.54,5.37	1.45	0.47,4.52	1.51	0.48,4.70
SE full -time	0.61	0.28,1.34	0.76	0.33,1.73	0.66	0.29,1.50	0.69	0.30,1.57
Part-time	0.39*	0.16,0.91	0.44	0.18,1.04	0.39*	0.17,0.93	0.40*	0.17,0.95
Full-time	0.38***	0.23,0.61	0.52*	0.30,0.89	0.44**	0.25,0.78	0.46**	0.26,0.81
BP - Paid work[a]								
SE part-time	51.06**	4.80,542.78	48.70**	4.44,534.3	24.61**	2.52,240.37	23.32**	2.31,235.57
SE full -time	0.93	0.47,1.87	0.89	0.43,1.85	0.72	0.35,1.50	0.65	0.31,1.36
Part-time	6.79**	2.10,21.94	7.17**	2.19,23.52	3.72*	1.16,11.96	3.14	0.97,10.19
Full-time	0.71	0.42,1.21	0.67	0.37,1.20	0.47*	0.25,0.87	0.42**	0.23,0.79
N (observations)				5,964				
n (individuals)				2,279				
Women								
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.78	0.25,2.48	0.82	0.26,2.62	0.82	0.26,2.62	0.81	0.25,2.59
SE full -time	0.36	0.12,1.12	0.43	0.14,1.36	0.40	0.12,1.26	0.40	0.12,1.27
Part-time	0.75	0.44,1.26	0.87	0.50,1.49	0.82	0.48,1.41	0.82	0.48,1.40
Full-time	0.26***	0.16,0.42	0.35***	0.21,0.58	0.33***	0.19,0.55	0.33***	0.20,0.56
BP - Paid work[a]								
SE part-time	2.37	0.42,13.38	2.75	0.48,15.76	1.50	0.26,8.71	1.44	0.25,8.24
SE full -time	1.27	0.41,3.92	1.52	0.48,4.79	0.91	0.28,2.90	0.87	0.28,2.77
Part-time	1.19	0.60,2.35	1.41	0.70,2.83	1.16	0.57,2.35	1.12	0.55,2.26
Full-time	0.43**	0.25,0.73	0.54*	0.31,0.96	0.37**	0.20,0.67	0.35***	0.20,0.64
N (observations)				7,250				
n (individuals)				2,708				

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income; Model 4: model 3+self-rated health and GHQ score. Reference category: [a]no paid work. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18) and UKHLS (waves 2, 4, 6). Author's own calculations.

corresponding within estimates also show an effect in the same direction, although it is not significant (OR: 1.51 CI: 0.48, 4.70).

Among women (table 8-5, lower panel), within person estimates show that a given individual working in full-time employment has decreased odds of volunteering weekly in mid to later life (OR: 0.33 CI: 0.20, 0.56), after adjusting for potential confounders. A relationship in the same direction can be observed at the between-person level. On average, women who work full-time are less likely to volunteer on a weekly basis at the following wave (OR: 0.35 CI: 0.20, 0.64). Other within and between person effects for women in the lagged models are not statistically significant.

To summarise, the results presented in tables 8-4 and 8-5, show that for both men and women, full-time employment leads to a lower likelihood of volunteering on a monthly and weekly basis at the following observation point. These relationships support the substitution role hypothesis, as employment and volunteering seem to be competitive activities for men in mid to later life, who may have to give-up one to partake in the other. However, as both between and within effects are implicated, different mechanisms, such as selection, may be involved. Among men full-time self-employment and part-time employment also lead to lower odds of subsequent volunteering. However, selection effects may be driving the relationship in the opposite direction, as some models in tables 8-4 and 8-5 provide some evidence which suggest that on average those working in part-time and self-employment are more likely to volunteer.

8.5 Focusing on volunteers: does paid work affect frequency of volunteering?

Previous sections examined whether participation in the paid labour market affects men and women's likelihood of engaging in volunteering. This section extends these analyses, by restricting the models only to individuals who volunteered on a monthly basis or more, in order to evince whether participation in the paid labour market affects frequency of volunteering. Moreover, the results indicate whether paid work affects individuals' likelihood of participating in volunteering on a weekly basis or more frequently. As discussed in chapter three, some evidence suggests that certain types of employment (e.g. part-time and self-employment), may provide more flexible work schedules that enable individuals to

combine engagement in volunteering and paid work (Freeman 1996; Thompson 1993a, 1993b). Such finding would support the role substitution hypothesis as, for example, individuals who work part-time may substitute the time they do not spend on paid work, if they would have been working full-time, with engagement in volunteer work. In order to model the likelihood of at least weekly volunteering among individuals who volunteer on a monthly basis, the analyses are restricted to all observations where respondents report either volunteering monthly or weekly. Therefore, the sample is substantially smaller compared to previous analyses, as only a minority of the sample engages in volunteering, as suggested by the descriptive results (table 8-1).

Table 8-6 (upper panel) shows the likelihood of engaging in volunteering on a weekly basis or more frequently amongst other volunteers, for men and women. The models are analogous to the ones presented in section 8.3 (i.e. models are not lagged), made exception for restricting the sample to observations where individuals reported that they were volunteering. Among male volunteers, full-time paid work affects the likelihood of volunteering weekly or more frequently, as according to within-person estimates full-time employment leads to lower odds of weekly volunteer work (OR: 0.33 CI: 0.16, 0.66). However, unlike all other models presented in the previous sections of this chapter, there is no statistically significant effect of full-time employment on paid work (OR: 0.59 CI: 0.33, 1.07), suggesting that selection effects may not be as important for this relationship. There is a negative relationship according to within-person estimates also for part-time employment, though the relationship is not statistically significant (OR: 0.42 CI: 0.17, 1.07) In addition, between effects suggest that male volunteers who work in full-time self-employment, on average, have decreased odds of volunteering weekly or more frequently (OR: 0.38 CI: 0.19,1.76).

The picture for women is partially different (table 8-6, lower panel), as participation in employment has a stark effect on the likelihood of engaging in volunteer work on a weekly basis. Among female volunteers, participation in part-time (OR: 0.39 CI: 0.19, 0.80) and full-time employment (OR: 0.43 CI: 0.21, 0.87) leads to decreased odds of weekly volunteering, after controlling for potential confounders. Corresponding between-person estimates show a relationship in the same direction, as both part- and full-time employees are on average less likely

Table 8-6 Odds of weekly volunteering among individuals volunteering at least on a monthly basis; within-between random effects models.

	Men							
	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.75	0.23,2.45	0.70	0.21,2.31	0.72	0.22,2.40	0.70	0.21,2.31
SE full -time	1.26	0.49,3.23	1.16	0.44,3.05	1.20	0.45,3.18	1.22	0.46,3.23
Part-time	0.44	0.18,1.07	0.41	0.16,1.03	0.42	0.17,1.07	0.42	0.17,1.07
Full-time	0.33***	0.18,0.61	0.32***	0.16,0.62	0.34**	0.17,0.67	0.33**	0.16,0.66
BP - Paid work[a]								
SE part-time	1.86	0.30,11.40	1.64	0.27,9.97	1.59	0.25,9.91	1.50	0.24,9.52
SE full -time	0.52*	0.28,0.97	0.40**	0.21,0.78	0.40**	0.21,0.80	0.38**	0.19,0.76
Part-time	1.04	0.40,2.70	1.01	0.39,2.61	1.00	0.38,2.63	0.95	0.36,2.53
Full-time	0.86	0.53,1.40	0.61	0.35,1.05	0.64	0.36,1.14	0.59	0.33,1.07
N (observations)	1,529							
n (individuals)	701							
	Women							
	Model 1		Model 2		Model 3		Model 4	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.54	0.17,1.69	0.54	0.17,1.70	0.55	0.17,1.76	0.54	0.17,1.72
SE full -time	0.53	0.14,2.00	0.58	0.15,2.25	0.63	0.16,2.44	0.60	0.15,2.35
Part-time	0.33**	0.16,0.66	0.36**	0.18,0.74	0.39**	0.19,0.80	0.39*	0.19,0.80
Full-time	0.32***	0.17,0.63	0.37**	0.19,0.75	0.43*	0.21,0.87	0.43*	0.21,0.87
BP - Paid work[a]								
SE part-time	0.43	0.11,1.63	0.41	0.11,1.54	0.51	0.13,1.92	0.51	0.14,1.94
SE full -time	0.15***	0.05,0.42	0.13***	0.04,0.38	0.15***	0.05,0.44	0.16***	0.05,0.46
Part-time	0.35**	0.18,0.70	0.34**	0.17,0.69	0.38**	0.19,0.76	0.38**	0.19,0.77
Full-time	0.48*	0.27,0.84	0.46*	0.25,0.84	0.52*	0.27,0.98	0.53	0.28,1.00
N (observations)	2,214							
n (individuals)	998							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income; Model 4: model 3+self-rated health and GHQ score. Reference category: [a]no paid work. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18) and UKHLS (waves 2, 4, 6). Author's own calculations

Table 8-7 Odds of weekly volunteering among individuals volunteering at least on a monthly basis; lagged within-between random effects models.

	Men							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.35	0.25,7.23	1.30	0.23,7.45	1.33	0.23,7.81	1.34	0.22,8.13
SE full -time	1.08	0.31,3.73	1.20	0.33,4.31	1.22	0.33,4.47	1.28	0.35,4.75
Part-time	0.52	0.13,2.03	0.54	0.13,2.21	0.57	0.14,2.36	0.55	0.13,2.34
Full-time	0.63	0.27,1.48	0.88	0.34,2.24	0.93	0.35,2.47	0.95	0.36,2.54
BP - Paid work[a]								
SE part-time	4.99	0.58,42.58	5.05	0.54,46.88	5.84	0.60,56.95	5.91	0.59,59.21
SE full -time	0.49*	0.25,0.96	0.40*	0.19,0.83	0.40*	0.19,0.84	0.35**	0.16,0.77
Part-time	2.21	0.65,7.50	2.29	0.65,8.03	2.28	0.63,8.28	2.04	0.55,7.56
Full-time	0.75	0.44,1.26	0.54*	0.30,0.99	0.57	0.30,1.10	0.53	0.27,1.04
N (observations)	875							
n (individuals)	501							
	Women							
	Model 1		Model 2		Model 3		Model 4	
Lagged variables (t_{-1})	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.81	0.14,4.61	0.88	0.15,5.27	0.91	0.15,5.43	0.90	0.15,5.39
SE full -time	0.57	0.10,3.22	0.82	0.14,4.89	0.89	0.15,5.42	0.87	0.14,5.27
Part-time	0.88	0.34,2.23	1.10	0.42,2.92	1.09	0.41,2.91	1.11	0.41,2.97
Full-time	0.23**	0.09,0.59	0.33*	0.13,0.89	0.35*	0.13,0.95	0.35*	0.13,0.95
BP - Paid work[a]								
SE part-time	0.18	0.03,1.10	0.14*	0.02,0.91	0.17	0.03,1.12	0.18	0.03,1.19
SE full -time	0.20*	0.05,0.82	0.17*	0.04,0.73	0.19*	0.04,0.81	0.19*	0.04,0.83
Part-time	0.65	0.27,1.57	0.70	0.28,1.75	0.76	0.30,1.90	0.77	0.31,1.93
Full-time	0.46*	0.22,0.93	0.42*	0.19,0.93	0.43*	0.19,0.99	0.45	0.20,1.02
N (observations)	1,274							
n (individuals)	693							

Notes: Model 1: unadjusted; Model 2: model 1+age, cohort, marital status; Model 3: model 2+education, tenure, subjective financial situation, income; Model 4: model 3+self-rated health and GHQ score. Reference category: [a]no paid work. OR: odds ratio; CI: 95% confidence interval; WP: within person; BP: between person; SE: self-employment; GHQ: general health questionnaire. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: BHPS (waves: 6, 8, 10, 12, 14, 16, 18) and UKHLS (waves 2, 4, 6). Author's own calculations

to volunteer weekly, among female volunteers – in model 4 the estimate for full-time employment becomes only marginally non-significant, albeit confidence intervals still support a negative relationship (OR: 0.53 CI: 0.28,1.00). Furthermore, also full-time self-employees have decreased odds of weekly volunteering according to the between estimate (OR: 0.16 CI: 0.05, 0.46).

The last table of this chapter, (table 8-7), shows the same models with the independent variables lagged (t_{-1}), in order to deal with possible reverse causality mechanisms. The upper panel shows that among male volunteers, none of the within-person estimates is significant, indicating that prior employment does not directly affect frequency of volunteers after two years of follow-up. However, between estimates show that men who are full-time self-employed, are less likely to volunteer on a weekly basis (OR: 0.35 CI: 0.16, 0.77). Results show also weak evidence for a relationship in the same direction for full-time employment that however is marginally non-significant (OR: 0.59 CI: 0.33, 1.07, N.S.).

Among female volunteers, there is evidence that prior full-time employment leads to decreased odds of volunteering on a weekly basis at the following wave (OR: 0.35 CI: 0. 13, 0.95). The corresponding between person effects show a relationship in the same direction (model 3, OR: 0.43 CI: 0. 19, 0.99), that becomes non-significant after accounting for health-related variables (OR: 0.45 CI: 0.20, 1.02). Women who are full-time self-employed have lower odds of engaging in volunteering at the higher frequency (OR: 0.19 CI: 0.04, 0.83).

Overall, results presented in tables 8-6 and 8-7 indicate that full-time paid work is directly associated with frequency of volunteering. The results are observed through within-person estimates, therefore we can infer that selection effects are not driving this relationship. However, for men, a significant relationship was not observed in the time-lagged models, suggesting that reverse causality may be driving this relationship. Among female volunteers also part-time employment was associated with lower likelihood of volunteering weekly, according to within person estimates, however, the effect was not observed in the time lagged models. It should be noted that the lack of a relationship in the time lagged models could be also due to the two years gap between each wave being too large. Finally, between effects, also showed negative relationship between self-employment and frequency of volunteering.

8.6 Conclusion

Longitudinal evidence on the relationship between employment status and engagement in volunteering is presented in this chapter. Results showed that employment status affects engagement in volunteering on both a monthly and weekly basis. Results in section 8.3 showed that for both men and women, being in full-time employment leads to lower odds of engagement in volunteering. These results corroborate previous longitudinal evidence that reported similar effects among samples of older adults (Butrica *et al.* 2009; Carr & Kail 2012; Hank & Erlinghagen 2009a; Mutchler *et al.* 2003). However, these results are in disagreement with a previous study that used ELSA data (Di Gessa & Grundy 2016). The effect of part-time and self-employment on engagement in volunteering varies between contemporaneous and lagged models, monthly and weekly volunteering and genders. According to the contemporaneous models, part-time and full-time self-employment lead to significantly lower odds of volunteering on a weekly basis for women but not for men (table 8-3). By contrast, estimates from lagged models show that part-time employment and full-time self-employment lead to lower odds of monthly volunteering among men, but not women (table 8-4).

Between person effects show that part-time and self-employment are often positively associated with engagement in volunteering (tables 8-2 to 8-5), indicating that between and within person effects may be going in opposite directions. This would indicate that without separating within and between person effects, the estimates might have cancelled each other out. Therefore, previous studies that suggested that part-time paid work and self-employment may be conducive for volunteering (Choi 2003; Freeman 1996; Herzog & Morgan 1993; Mergenthaler *et al.* 2018; Thompson 1993b, 1993a; van der Horst *et al.* 2016), may have been affected by selection effects.

Both between and within effects were implicated, suggesting that part of the relationship may reflect causal processes, while the other part may be caused by self-selection into volunteering. Few previous studies have systematically addressed the issue on selection into volunteering (Lancee & Radl 2014; Wilson 2012), and the approach used here allows to decompose these effects. Results also show that separating within and between person effects is particularly important when considering the effect of part-time and self-employment, as selection effects and unobserved confounding may otherwise mask direct effects.

Similar to chapter seven there are limitations to the results presented in this chapter (see also sections 7.6 and 9.3). First, the approach taken herein does not allow causal inference, given that it relies on observational data. While the WB-RE approach provides an insight into causal and selection mechanisms, residual confounding may affect these relationships. Second, missing data and attrition may have affected these results. Third, information on volunteering was collected only every other year in the BHPS and the UKHLS, hampering comparison of these results with those presented in chapter seven – data on caregiving was collected during every wave of the study. Thus, it is not possible to know whether individuals were volunteering in the two years between each interval. Fourth, information regarding individuals' volunteering intentions, and the organisations that individuals volunteered for, was not considered. Research that examines how the effect of paid work on volunteering varies when accounting for volunteering intentions could be valuable for organisations that recruit volunteers (Dury *et al.* 2014; Einolf 2011).

Chapter 9

Discussion and Conclusion

9.1 Introduction

The preceding three chapters presented the empirical findings of this thesis. Chapter six analysed pathways of engagement in multiple paid and unpaid activities from mid to later life, showing three distinct clusters of engagement. The *paid workers* pathway is characterised by trajectories of engagement with a higher probability of participation in full-time paid work, and a much lower probability of engaging in unpaid activities, relative to the other two pathways. The *mixed activities (housework)* pathway is characterised by lower probability of engagement in full-time paid work, a substantially higher probability of engagement in housework, and raised likelihood of providing informal care. The *mixed activities (volunteers)* pathway represents the experience of individuals who have a lower likelihood of participating in full-time paid work and a higher probability of providing informal care compared to the *paid workers*, and a substantially higher probability of engaging in volunteer work and civic participation. Evidence presented in chapter six showed that these pathways are highly gendered and are related to sociodemographic and health characteristics at baseline. This person-centred, exploratory approach contributes to the literature by showing the interplay between multiple paid and unpaid activities in mid to later life in a nuanced manner.

Chapters seven and eight, integrate the exploratory information presented in chapter six by examining the relationship between paid work and engagement in informal care provision and volunteering, taking a closer look at selection effects and direct influences in order to gain a better understanding of causal relationships. Furthermore, these chapters also provide more detail on how paid work affects the frequency of volunteering and the intensity of care provision. Overall, these chapters indicate that full-time employment competes with engagement in caregiving and volunteering, and that both direct influences and selection effects underlie these relationships after controlling for confounders. The longitudinal models show a more complex picture for self-employment and part-time paid work, as mainly between person estimates, thus selection effects, are implicated after controlling for confounders. This indicates that the relationships may be explained by experiences earlier in the lifecourse, such as prior attachment to the labour force, and fixed individual characteristics, i.e. those who are self-employed and working part-time are likely to be selected with respect to their engagement in caregiving and volunteering. These findings contribute to the current literature on the relationship

between paid work and engagement in informal care and volunteer work in later life. The results provide evidence that full-time employment limits engagement in caregiving and volunteering. The within person estimates, that are equivalent to estimates from fixed effects models, allow better causal inference as each individual acts as their own control. In addition, the findings suggest that future longitudinal research should carefully consider methods to explicitly consider selection effects, as these are implicated in the effect of full-time employment, and are particularly important for part-time and self-employment.

The results presented in the aforementioned chapters are discussed in detail in this chapter, comparing and contrasting these results to previous research and delving into the implications of the findings for policies that extend working lives and promote active ageing. The following section discusses the results of each empirical chapter in the context of previous studies. Section 9.2 outlines how the research findings contribute to current knowledge and previous literature, and how the findings compare to previous research. Section 9.3 discusses the limitations of the research presented in this thesis. This discussion also serves as a point of departure to outline avenues for future research to further extend our understanding of engagement in paid and unpaid activities in later life. Sections 9.4 discusses the ways in which the findings are relevant for social policies and in relation to sociodemographic and health inequalities in later life. Furthermore, it argues that research that is concerned with extending working lives and active ageing should carefully consider selection effects. Especially when using a lifecourse perspective, which is explicitly acknowledged in the active ageing framework (Walker 2002; WHO 2002), selection effects should not be merely discounted as nuisances in the way of causal estimates, as they carry implications for social policies of their own (George 2003).

9.2 Discussion of main findings

9.2.1 Pathways of engagement in paid and unpaid work in mid to later life

Chapter six examined the interdependent pathways in paid and unpaid work (caregiving, volunteering civic participation and housework) from mid to later life. This was done using a two-staged LCA approach that allowed the identification of distinct pathways of engagement in paid and unpaid work from ages 55 to 70. Furthermore, I analysed how pathways of engagement are associated with

sociodemographic characteristics and health. This approach aimed at capturing the complexity of how individuals combine engagements in paid and unpaid activities in the years leading up to and following age of eligibility for a state pension, which is the period when most individuals traditionally retire from the labour market. This person oriented analytical approach exploits the heterogeneity between individuals to understand how different groups of individuals in the analytical sample may be following different pathways of engagement in mid to later life, according to unobserved characteristics.

The results indicate that individuals included in the analytical sample conform to one of three engagement pathways: *paid workers, mixed activities (housework)*, and *mixed activities (volunteers)*. The first two pathways represent the experiences of a large majority of the sample (~89%), as the *paid workers* pathway captures the experience of 43% percent of the sample, and the mixed activities (housework) pathway represents the experience of 46%. These two pathways show starkly different and opposing trajectories, as individuals categorised in the *paid workers* cluster are far more likely to engage in full-time paid work at all ages, while individuals in the *mixed activities (housework)* pathway are relatively less likely to participate in full-time work, but more likely to engage in all other types of unpaid activities, particularly housework. Only 11% of the sample was found to be conforming to the third pathway, *mixed activities (volunteers)*. This pathway is more similar to the second pathway, *mixed activities (housework)*, as individuals are substantially less likely to engage in full-time paid work and more likely to engage in unpaid forms of work in comparison to the *paid workers* pathway. However, the distinctive feature of this latter pathway is that individuals have a much higher probability of engaging in volunteering and civic participation from ages 55 to 70. The three latent pathways are highly gendered: the *paid workers* pathway is composed of 2269 men (90%) and 259 women (10%); *the mixed activities (housework)* pathway is composed by 2495 women (93%) and 188 men (7%); finally, the mixed activities (volunteers) pathway is made-up by 251 men (39%) and 398 women (61%). The implications of gender differences are discussed more in detail in subsection 8.2.2.

Overall, these three pathways suggest that individuals who are more likely to participate in full-time paid work for longer (pathway 1, paid workers), are less likely to engage in unpaid forms of work, relative to the other two pathways.

Individuals in the paid workers pathway have a higher probability of engaging in full time paid work to begin with – 0.79 expected probability at ages 55 and 56 - compared to the *mixed activities (housework)* and the *mixed activities (volunteers)* – 0.48 and 0.58 probability at ages 55 and 56, respectively (figure 6-1). The probability of engaging in full-time paid work declines in all pathways, but it remains higher for the paid workers pathway at all ages, indicating that those in the first pathway are more likely to participate in full-time paid work for longer. For example, at ages 65 and 66, the probability of working full-time for individuals in the *paid workers* pathway declines to 0.27, but for the other two pathways it drops even lower – 0.05 for the second and 0.12 for the third pathway. However, individuals in the second and third pathways are more likely to engage in part-time paid work, though the difference is not as conspicuous as that for full-time.

Individuals captured in the mixed activities pathways, are more likely to engage in any of the unpaid forms of work compared to the *paid workers pathway.* The trajectories of housework and caregiving, traced in the *mixed activities (housework) pathway,* are noticeably higher in regard to engagement in housework activities and informal care provision compared to the *paid workers* - differences for volunteering and civic participation are smaller (figure 6-1). Respondents grouped in the *mixed activities (volunteers),* are more likely to engage in all unpaid activities compared to the *paid workers* pathway, with a particularly large difference for civic participation and volunteering.

The findings, however, do not suggest that full-time paid work strictly competes with engagement in unpaid activities, as within each pathway the declining likelihood of working full-time is generally not paralleled by rising likelihoods of engagement in unpaid forms of work. These findings do not support the role substitution hypothesis, which would predict that individuals would substitute the loss of full-time paid work with engagement in unpaid forms of work (Mutchler *et al.* 2003). Instead, these results lend support to the continuity theory of ageing, as individuals seem to maintain similar patterns of engagement in unpaid activities through mid to later life (Atchley 1989). The trajectories traced in the engagement pathways do not suggest that leaving full-time paid work leads to engagement in unpaid activities. For example, the *paid workers* pathway shows a constantly low probability of engaging in unpaid activities, even past the age of 65, when the probability of engaging in full-time paid work declines to approximately

0.1 (figure 6-1a). The only exception is the slight increase in the likelihood of engaging in volunteering and civic participation in the *mixed activities (housework)* pathway (figure 6-1b). The probability of engaging in volunteer work and civic participation rises from 0.06 to 0.12, and from 0.11 to 0.19, respectively, from the ages of 55/56 to 69/70; however, this increase is still small compared to the decline in full-time paid work from 0.48 to 0.01 that occurs in the same period for people on the *mixed activities (housework)* pathway.

The trajectories shown in the latent pathways suggests that individuals who belong to the *mixed activities* pathways (pathways 2 and 3) are less likely to participate in full-time paid work and more likely to engage in unpaid activities to begin with. The fact that engagements in full-time paid work and unpaid activities do not substitute for each other within each pathway suggests that these patterns may reflect differences that are due to selection effects or influences that are located earlier in the lifecourse. For example, those conforming to the *mixed activities* pathways may have had prior lifecourse experiences characterised by intermittent spells of employment and a higher likelihood of engaging in unpaid forms of work. These patterns of engagement characterised by combining paid and unpaid work may have lasted into mid to later life.

The findings support previous evidence that indicates that attachment to paid and unpaid work earlier in the lifecourse may affect patterns of engagement in later life (Lancee & Radl 2014; Pienta *et al.* 1994; Young & Grundy 2008). Previous research has provided support for the attachment hypothesis in regard to employment for women, i.e. women who are continuously in employment during their adult lives are more likely to participate to the labour force in later life (Pienta *et al.* 1994). This mechanism may also be relevant for unpaid forms of work, whereby individuals who are more "attached" to unpaid forms of work earlier in their lifecourse are more likely to partake in these activities in later life. Previous evidence has suggested that such a mechanism may exist for volunteering and informal care provision. Longitudinal evidence from the ONS-LS showed that, among individuals aged 40-59, men with prior histories of lower employment, and women with histories of no employment or employment involving a caregiving dimension, were more likely to provide informal care (Young & Grundy 2008). Longitudinal evidence from the 1989-2009 German SOEP, suggested that patterns

of volunteering are mostly stable throughout the lifecourse as volunteers may generally be considered a selected group of individuals (Lancee & Radl 2014).

The research presented in chapter six does not examine factors earlier in the lifecourse, therefore it is not possible to conclude that prior lifecourse experiences explain the observed patterns. Further research could elucidate a lifecourse explanation for patterns of engagement in unpaid work in later life, possibly using data on engagement in unpaid activities in birth cohort studies. Nevertheless, findings from the two-staged LCA contribute to current knowledge by showing a nuanced picture of the interplay between paid work and unpaid activities, that would not have been gained from studies examining the relationship between paid work and single unpaid activities (e.g. Carmichael et al. 2010; Carr et al. 2018; Chambré 1984; Di Gessa & Grundy 2016; Hank & Stuck 2008). In addition, previous studies were limited by the fact that they only look at short term changes. Findings emphasise that individuals who are most likely to take part in unpaid activities in later life, were more likely to do so already at age 55, and the probability remains mostly constant across the ages of 55 to 70. Future work could further investigate whether factors earlier in the lifecourse determine pathways of engagement in mid to later life.

Compared to previous research that investigated patterns of engagement in multiple activities using cross-sectional analyses (Burr *et al.* 2007; Fernandez-Ballesteros *et al.* 2011; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014), in this study, fewer latent classes, i.e. distinct clusters of engagement, were identified. This may be due to the fact that the two-staged LCA approach accounts for age related effects by modelling them explicitly, as the longitudinal data is ordered by age, rather than wave. For example, Burr et al. (2007) report that clusters of activities are age graded, and that this might be due to individuals reducing their engagement in unpaid activities done outside the home, such as volunteering. They suggest that their findings support the selective optimisation with compensation theory of successful aging, which proposes that older adults reduce the number of activities in which they engage as they age (Baltes & Baltes 1990). However, the approach used here highlights the importance of cohort differences rather than age, as differences in engagement in unpaid activities do not seem to be determined by age, in this limited age range. The probability of engaging in unpaid activities is mostly constant over time for each pathway – only the full-time paid work trajectory

changes considerably from ages 55 to 70. As indicated by Komp and colleagues, research on engagement in later life should carefully consider the effect of age, as it may reflect several different mechanisms, e.g. declining health, retirement from paid work, cohort and period effects (Komp *et al.* 2011).

Instead, there are noticeable variations across individuals rather than age, as trajectories of engagement in unpaid forms of work are largely constant over time, but vary across the three pathways. Furthermore, these differences are highly gendered and are related to prior sociodemographic and health characteristics, measured at baseline, underscoring the importance of considering inequalities in engagement in mid to later life. Compared to previous research, findings underscore the importance of taking a longitudinal approach that enables the observation of changes in engagement in paid and unpaid activities over time in a lifecourse perspective, in this case from mid to later life.

Similar to some previous research, engagement was significantly related to socioeconomic and health characteristics (Burr *et al.* 2007; Mergenthaler *et al.* 2018; Morrow-Howell *et al.* 2014). Multivariate models showed that, compared to men who are classified in the *paid worker* pathway, men in the *mixed activities (housework)* pathway have lower socioeconomic status and worse health, as they are more likely to have a mortgage or rent rather than be homeowners, more likely to belong to lower income quintiles, and more likely to report at least one chronic health problem (table 6-3). Bivariate models also showed a gradient for education and a higher odd of reporting poorer health and having a worse mental health score. By contrast, men classified in the *mixed activities (volunteers)* group have higher levels of education. Furthermore, bivariate models suggest that they are more likely to belong to higher household income quintile groups, less likely to report difficult subjective financial circumstances, less likely to report poorer health, and have a better mental health score, compared to the *paid workers* latent subgroup. Similar patterns can be observed among women (table 6-4). Compared to women in the *mixed activities (housework)* pathway, those in the *paid worker* subgroup are less likely to belong to lower income quintile groups, have higher education, and have better health outcomes. Women in the paid workers group are also significantly more likely to have a mortgage than to be homeowners, suggesting that paying a mortgage may be an important factor promoting women's participation in full-time employment in mid to later life. This is in agreement with previous research

suggesting that individuals who have household debts or mortgages to pay, have an incentive to work for longer (Lain 2015; Scherger 2015). Women in the *mixed activities (volunteering)* pathway are more likely to have higher education, less likely to be renting or have a mortgage than be homeowners, less likely to belong to lower income quintiles and according to bivariate models, less likely to report poorer health and more likely to have a better mental health score.

The fact that sociodemographic factors are associated with the latent engagement pathways emphasises the importance of considering mechanisms of cumulative inequality (see section 4.5). For example, circumstances of disadvantage are compounded for individuals in pathway 2, *mixed activities (housework)*, as membership to this group is related to lower socioeconomic position and worse health. In comparison to the *paid workers* pathway, individuals in pathway 2 are characterised by trajectories of engagement in non-discretionary unpaid activities (housework and informal care provision), which would not be expected to have health enhancing effects. Informal care may even have detrimental consequences on health (e.g. Potočnik & Sonnentag 2013; Sacco et al. 2018; Vlachantoni et al. 2013; Wahrendorf et al. 2008). The lower health status of individuals in pathway 2 may act as a barrier to longer working lives, as people who work past SPA are more likely to have better prior health (Barban *et al.* 2017; Di Gessa *et al.* 2017). Similarly health may act as a barrier for health enhancing activities, such as volunteering (Li & Ferraro 2006). Having lower economic resources may decrease the likelihood of engaging in volunteering, as predicted by resource theory (section 4.6), as financial resources and education are important aspects of human capital that facilitate volunteering (Wilson & Musick 1997).

By contrast, the higher socioeconomic position and better health of individuals in pathway 3, *mixed activities (volunteers),* may facilitate their choices regarding engagement in later life. Higher income and homeownership can provide financial security, enabling more control over when and whether they wish to retire from the paid labour market. Moreover, individuals with higher education have better access to volunteering opportunities and economic resources to privately purchase services to deal with housework duties (see "income effect" in section 4.3.2). It should be noted that while these relationships are far from causal (as reverse causality mechanisms may affect these relationships), the associations nonetheless provide novel evidence supporting the existence of inequalities in mid

to later life engagement in the UK, that may be relevant for gender, socioeconomic and health inequalities.

These findings emphasise the importance of considering gender, socioeconomic and health inequalities in relation to the prospect of longer working lives and active ageing. Results support concerns regarding the potential detrimental effect that extending working lives and active ageing related policies may have on social and health inequalities (Gonzales *et al.* 2015; Timonen 2016). Active ageing policies may not be inclusive of those in worse health and with lower socioeconomic position, as individuals in pathway 3 seem to be the only ones that reach the active ageing ideal of high engagement in multiple activities, including participation in health enhancing endeavours such as volunteering (Boudiny 2013; Ferraro & Shippee 2009; O'Rand 1996). Extending working lives may exclude individuals following the *mixed activities (housework)* pathway, as worse health and lower socioeconomic position may act as barriers to employment, even though these individuals may need to work in later life as they are more likely to have lower income and to be renting. Policies should consider avoiding taking a blanket approach to extending working lives, and instead recognise the heterogeneity of individuals' circumstances.

9.2.2 A gendered perspective on pathways of engagement

As mentioned above, the three latent pathways yielded in chapters six are highly gendered, as women are much more likely to engage in unpaid forms of work and part-time paid work, while men are more likely to work in full-time employment at all ages. Women are more likely to combine full-time paid work with engagement in unpaid activities, in particular housework, and to work in part-time employment. By contrast men are more likely to work in full-time employment for longer. This gendered division of labour reflects the "male breadwinner family" (MBWF) model that is particularly relevant for individuals in the sample who belong to older cohorts, and therefore lived their adult lives when this model was more common (Creighton 1999; Janssens 2009). Patterns of work in the post-war period were highly influenced by welfare systems that institutionalised a gendered division of labour whereby men's role was that of the economic provider for the family, with little or no responsibility in regard to housework and childrearing. In contrast, women largely had a caregiving role with, responsibility for the management of the home and childcare (Creighton 1999; Lewis 1992). Social policies in the second half

of the nineteenth century, disincentivised women's employment, in favour of a family wage model, i.e. a single earner providing for a family (Creighton 1999). For example, tax regimes and housing subsidies facilitated family arrangements whereby the economic support of a household relied on the wages of a single earner (Creighton 1999). Previous lifecourse research has shown that these gendered patterns of employment in adult life may affect levels of employment in later life (Corna & Sacker 2013). This is also corroborated by findings in chapter six, showing that the *paid workers* pathway is more common among women born in later cohorts (table 6-7), with the MBWF model becoming less entrenched as more women joined the labour force.

Nevertheless, the decline of the MBWF model was only partial (Creighton 1999), as the UK has been defined as a "modified male bread family winner" society. In this arrangement, married women are more likely to work part-time or have lower attachment to full-time employment, while men are more likely to work full-time continuously throughout their lifecourse, regardless of marital status (O'Connor *et al.* 1999). Women who are married are theorised to be more likely to follow to the "female caregiver" role compared to unmarried women, as the modified MBWF model implies the presence of a male partner. Men, on the other hand, are theorised to follow a continuous full-time paid work career regardless of marital status, as it represents a default career for men. Findings using ELSA data supported this perspective (van der Horst *et al.* 2016, 2017). Furthermore, previous research showed that divorced women are more likely to work in later life in the US (Pleau 2010; Pleau & Shauman 2013).

The findings presented in chapter six also support the presence of the modified MBWF, as the regression analysis shows that marital status is particularly important in determining women's pathway of engagement. Unmarried, and particularly divorced, women are more likely to follow the *paid workers* pathway than married women (table 6-7). This might be due to women being more likely to experience interrupted careers and have lower pension incomes in retirement (Scherger 2015). Marital status is not as important for men: some evidence shows that men who are divorced and never married are more likely to follow the *mixed activity (housework)* pathway, but this association disappears in the multivariate model (table 6-6).

While previous research mostly focused on how the MBWF affects employment status in later life, evidence shown in chapter six provides novel insights into how the gendered division of labour may affect engagement in various types of unpaid activities through retirement. The likelihood of engaging in unpaid activities in the mixed activities pathways is higher compared to the *paid workers* pathway, and it remains constant – or even undergoes a small increase – as the probability of engagement in full time employment declines for all pathways, i.e. after ages 65 and 66. As these pathways mostly comprise women, the experience of retirement may be quite different by gender. Women's engagement seems to conform to the continuity theory of ageing (section 4.2.1) as women maintain their levels of engagement in unpaid work between ages 55 to 70. By contrast, the experience of men, who comprise the majority of the *paid workers* group, seem to conform to the disengagement theory (section 4.2.1), as the probability of participating in full-time employment declines while the probability of engaging in unpaid activities remains low. These results provides support for qualitative findings from previous studies that indicate that retirement may have quite different meanings for men and women (Loretto & Vickerstaff 2012). However, it should be noted that these considerations overlook those men who are classified in the *mixed activities* pathways and the women who are classified in the *paid workers* pathway. This has important implications for active ageing related initiatives, as it suggests that individuals who mostly engage in full-time paid work are less likely to engage in unpaid activities in mid to later life, even after leaving employment. Therefore, this suggests that extending working lives for this group may not affect their engagement in unpaid work.

9.2.3 The effect of paid work on informal care provision

The results from the two-staged LCA provide a nuanced picture of the interrelationships between paid work, informal care provision and volunteering, as well as civic participation and housework, which have been included in order to gain a fuller understanding of engagement in paid and unpaid work in mid to later life. This person-centred approach revealed patterns and characteristics of mid to later life engagement that would have otherwise been ignored in a variable centred approach. The findings showed that full-time paid work is broadly competitive with unpaid activities, as a large part of the sample adhered to the paid workers pathway, whereby they were markedly more likely to engage in full-time employment

compared to the rest of the sample, but also less likely to engage in unpaid activities, including caregiving and volunteering. However, this approach, which is inductive in nature, does not enable the study of the dynamic changes in states over time, and it does not allow for the evaluation of causal influences. The patterns shown in chapter six, while they are informative in regard to the active and productive ageing perspectives, they provide limited insight into the assessment of the role substitution and role extension hypotheses (section 4.3.1), as selection effects and direct influences are conflated. While the latent pathways consider multiple activities simultaneously to provide a nuanced perspective on mid to later life engagement at the population level, this approach is not informative of causal mechanisms at the individual level. In addition, the two-staged LCA did not consider self-employed individuals as a separate category, and could only utilise binary variables for volunteering and caregiving, as the first stage LCA models often failed to converge in the presence of categories with small sample sizes.

The approach used in chapters seven and eight suitably integrates the findings discussed in the previous section, addressing the limitations of the two-staged latent class approach. Longitudinal WB-RE models were used to estimate the effect of paid work on engagement in volunteering and informal care provision, distinguishing effects that are due to within person and between person variability. Selection effects and direct, possibly causal, influences are disentangled into separate estimates. Furthermore, through this approach, it is possible to distinguish the effect of self-employment, and to evaluate how paid work affects frequency of volunteering and intensity of informal care provision. In this section, I discuss the effect of paid work on informal care provision, while the following section addresses engagement in volunteering.

Estimates show that, relative to being out of paid work, full-time employment is consistently negatively associated with engagement in caregiving, according to both between and within person estimates after adjusting for potential confounders (section 7.3, tables 7-2 and 7-3). The between and within estimates can be interpreted in two different ways, leading to two different conclusions about the implications of the findings. First, from the between person estimates we can infer that on average someone who works full-time is less likely to provide caregiving. This can be considered a population-level averaged effect, as it exploits only the variability between each individual. In other words, this relationship is likely to be

caused by unobserved factors. Considering that the models were adjusted for several potential confounders, unobserved characteristics are likely to include selection effects (e.g. experiences earlier in the lifecourse), and personality traits that may affect an individual's propensity to provide care (e.g. altruism). Second, the within person estimates show that for a given individual, full-time employment leads to a lower likelihood of engagement in informal care. This interpretation, which emphasises the subject specific effect of full-time employment on caregiving, is borne out by the fact that within person estimates utilise only information from individuals who change paid work status over time, in such a way that they act as their own control. This interpretation is consistent with the role substitution hypothesis, as any individual is less likely to provide informal care when they are working full-time.

While the interpretation of the subject specific within person effect is closer to a causal explanation, significant averaged effects also have policy implications. Regardless of the within person estimate, individuals in full-time employment are selected into having lower odds of caregiving. Therefore, initiatives that aim at increasing the number of potential carers need to also address selection effects (e.g. prior lifecourse experiences). The between effects seem to corroborate the results presented in chapter six, as individuals in the *paid workers* pathway, are less likely to provide informal care, even after they have left employment.

The negative effect of full-time employment is found for all intensities of informal care provision: any informal care and at least 20 hours per week. Therefore, being in full-time employment leads to lower odds of caregiving, possibly due to time constraints (role overload, section 4.3.1). Simultaneously, people who participate in full-time employment are less likely to provide informal care compared to those who are not in employment, putatively due to stronger attachment to the paid labour market. Time lagged models (table 7-4 and 7-5), confirm these results, showing that full-time employment leads to lower odds of caregiving at the following wave, i.e. one year later, and individuals who work full-time are on average less likely to provide care.

The effect of part-time work is not consistent across models. Part-time employment leads to lower odds of providing at least 20 hours per week of informal care (table 7-3). This supports the role substitution hypothesis (section 4.3.1) as part-time work is only in competition with caregiving duties at higher intensities of

care, suggesting that time constraints for part-time work only become relevant when more intensive care is provided. However, within person effects for part-time work are not statistically significant for men, while for women there is only weak evidence of a significant effect (OR: 0.72; CI: 0.50,1.04, p=0.08). Furthermore, between person effects show that women who work part-time are less likely to provide 20 or more hours of caregiving per week, according to both contemporaneous and time lagged models. As suggested by previous studies, this gender difference may be explained by opportunity costs, as women generally have lower income than men. Therefore the trade-off between part-time work and care may be lower for women, compared to men (Carmichael & Charles 2003b; Mentzakis *et al.* 2009). Regarding self-employment (both full and part-time), significant results are only reported according to between person estimates. Time-lagged models show that full-time self-employed men are on average less likely to provide care at all intensities, while part-time self-employed women were less likely to provide at least 20 hours of care per week, than those out of work.

Overall, the findings reported in chapter seven show that employment is generally competing with caregiving, with full-time employment always being negatively associated with providing care. Findings support previous studies showing that paid work limits engagement in informal care provision (Henz 2006), including studies that did not specifically focus on older adults (Carmichael *et al.* 2010; Robards *et al.* 2015). Furthermore, similar to previous studies, the effect of paid work may be stronger at higher intensities of care provision (Carmichael *et al.* 2010; Robards *et al.* 2015). However, findings presented here show that both within and between person effects are relevant for these relationships, indicating that part of the relationship is mediated through selection effects. As suggested by previous research, prior experiences may affect individuals likelihood to engage in informal care provision, including employment histories and type of employment held (Young & Grundy 2008).

Findings presented in chapter seven (section 7.5) also indicate that paid work affects the likelihood of providing informal care among caregivers. For male and female caregivers, working in full or part-time employment leads to lower odds of providing at least 20 hours of care per week. This effect is also mediated through between estimates, suggesting that selection effects are implicated. However, the within person association for part-time employment is attenuated in the time lagged

models, becoming non-significant. This would imply that reverse causality mechanisms may be affecting the relationship. Full-time self-employed male caregivers and part-time self-employed female caregivers are on average less likely to provide at least 20 hours of care per week. The fact that employment status affects intensity of care provision is as yet an unexplored area. Evidence provided here suggests that such a relationship exists. Further research, including qualitative approaches, may shed light into how employment may affect the amount of care provided by carers, and whether individuals who struggle to balance these activities are more likely to refer to social care services or privately purchase assistance. While previous research has shown that tensions between the caregiver role and paid work has detrimental consequences on employment, such as wage penalties and increased sickness absences (Heitmueller & Inglis 2007; Mortensen *et al.* 2017a; Ugreninov 2013), further research could examine whether this role conflict may lead to detrimental outcomes in the caregiver role (e.g. relationship with and health of the care recipient).

Given concerns regarding possible shortfalls in the supply of caregivers in the coming decades (Pickard 2015), the fact that both within and between person effects mediate these relationships has important implications for policies that aim to increase the "pool" of available informal carer in the population. While within person mechanisms indicate that policies that help carers balance employment and caregiving duties may increase the number of people providing care, between effects suggest that policies should address factors that select individuals into employment and out of caregiving. Further research examining trajectories of care would be required in order to evaluate what factors earlier in the lifecourse may affect the likelihood of informal care provision in later life (Young & Grundy 2008).

9.2.4 The effect of paid work on volunteering

Herein, I discuss the findings in chapter eight regarding the relationship between paid work and engagement in volunteering, estimated with WB-RE models. Similar to findings reported for caregiving, results provide evidence supporting a competing relationship between full-time employment and volunteering, mediated through both within and between person effects (section 8-3). These effects are consistent for both men and women, even in the time lagged models, which assess the effect of employment on volunteering at the following wave, two years later, in order to rule out reverse causality as a mechanism (section 8.4, tables 8-4 and 8-5).

The finding that full-time employment has a negative effect on engagement in volunteering is in line with previous longitudinal evidence using samples of older adults (generally over the age of 50) from other European countries and North America (Butrica *et al.* 2009; Carr & Kail 2012; Hank & Erlinghagen 2009a; Mutchler *et al.* 2003). The results are not in agreement with a previous longitudinal study using ELSA data that found no longitudinal relationship between changes in paid work, and formal engagement at follow-up (Di Gessa & Grundy 2016). However, while the variable of formal engagement used in the study by Di Gessa and Grundy (2016) considered volunteering, it also included engagement in other activities in its definition, such as participation in political and religious organisations, and educational courses. Furthermore, as the study utilised only two waves, they did not have a large enough sample to distinguish part-time and full-time work (Di Gessa & Grundy 2016).

The effect of part-time paid work and self-employment, reported in chapter eight, is less consistent across within and between person estimates, contemporaneous and lagged models, and genders. Findings from WB-RE models show that, among women, being in self-employment leads to lower odds of volunteering on a monthly and weekly basis, and that part-time employment leads to lower odds of volunteering on a weekly basis only (tables 8-2 and 8-3). This would suggest that substitution effects may also be relevant for part-time paid work and self-employment. However, in the time-lagged models, these effects are markedly weaker and non-significant (section 8.4.2, tables 8-4 and 8-5). This suggests that reverse causality mechanisms may be underlying the effects observed in the contemporaneous models. Among men, results from the lagged models show that part-time employment leads to lower odds of volunteering on a monthly and weekly basis, and full-time self-employment leads to lower odds of monthly volunteering (section 8.4.2, tables 8-4 and 8-5). Between person estimates show that individuals who work part-time and those who are self-employed are on average more likely to volunteer compared to those who are out of work.

Previous literature suggested that those in forms of paid work other than full-time employment, such as part-time work and self-employment, may be more likely to engage in volunteering, supporting the role extension hypothesis (section 4.3.1) (Choi 2003; Freeman 1996; Herzog & Morgan 1993; Mergenthaler *et al.* 2018; Thompson 1993b, 1993a; van der Horst *et al.* 2016). However, none of these studies

assessed the longitudinal prospective relationship or used methods that explicitly deal with selection effects. Findings presented in chapter eight partly corroborate previous studies, as after adjusting for potential confounders, part-time and self-employment are related to higher odds of monthly volunteering (tables 8-4 and 8-5). However, this effect is only found through the between person estimates. This indicates that any positive effects of part-time and self-employment on volunteering are likely to be due to selection effects. Thompson argued that two mechanisms may mediate the relationship between self-employment and volunteering (Thompson 1993b). First, those who are self-employed may have more control over their work schedules, therefore they may have more time for volunteering compared to those who are in full-time employment. Alternatively, those who are self-employed may be more likely to volunteer due to the fact that they are more integrated in their communities – i.e. individuals who are self-employed are selected into volunteering. Our findings would support the second mechanism, indicating that selection effects underlie the effect of part-time and self-employment on volunteering.

Findings in chapter eight also show that paid work affects the frequency of volunteering among individuals who volunteer on a monthly basis. Non-lagged models show that part-time employment leads to lower odds of weekly volunteering among women, while full-time employment leads to lower odds of weekly volunteering among both men and women. Lagged models show that male and female volunteers who are in full-time self-employment are less likely to volunteer on a weekly basis at the following wave. Among women, participating in full-time employment leads to lower odds of volunteering on a weekly basis. Overall, these results suggest that part-time and full-time employment may have a direct negative effect on frequency of volunteering. Volunteers working in self-employment are less likely to volunteer on a weekly basis, however, this effect is mediated by selection effects.

9.3 Limitations and future research

While findings presented in chapters six to eight provide an original contribution to current knowledge on engagement in paid and unpaid work in mid to later life, with a specific emphasis on how paid work affects engagement in informal care provision and volunteering, there are a number of limitations that should be discussed.

First, while the two-staged LCA approach taken in chapter six shows how the probability of engagement in paid and unpaid work changes through time, it does not allow one to investigate the dynamics of these activities. Findings do not show whether individuals commence or quit engagement in a given activity in each pathway. It is not possible to verify whether individuals' engagement is stable over time, or whether individuals who belong to a given latent pathway take-up and leave activities over time, as the two stage LCA approach summarises engagement in paid and unpaid work into relatively large subgroups. Research presented in chapters seven and eight addresses this pitfall, as within person estimates yielded by the WB-RE models reflect individuals' dynamic changes in status over time, showing how longitudinal employment transitions affect volunteering and caregiving transitions.

Second, the sociodemographic and health covariates used in the regression analysis, in chapter six, provided information only at baseline (section 6.5). Therefore, the associations shown in table 6-6 and 6-7 cannot be used to draw causal inferences. This is nevertheless a novel attempt to understand how sociodemographic inequalities may be related to inequalities in engagement, as very little research has examined this issue (Gonzales *et al.* 2015; Mergenthaler *et al.* 2018; Timonen 2016). Further research may extend these findings by using a lifecourse perspective to understand how cumulative inequality shapes engagement in paid and unpaid work in later life.

Third, the findings presented in chapter six are relevant to the particular context of the UK and the cohorts used herein. Results may be different for other cohorts or in other geographic and national contexts. As mentioned above (sections 9.2.2), the cohorts analysed here lived in a welfare state that promoted the division of labour according to the modified MBWF model. The interplay between paid and unpaid activities may be different for future cohorts, especially considering the increasing number of women joining the labour force in the past decades.

Fourth, in the two-staged LCA models it was only possible to include binary measures for informal care provision, civic participation and volunteering, given that the first stage models were particularly susceptible to categories with low numbers. Volunteering and civic participation were considered only when undertaken at least monthly, while informal care provision was considered regardless of intensity or place (e.g. co-residential and extra residential care provision). Future research may attempt to differentiate different frequencies and

intensities of caregiving and volunteering. In addition, research on volunteering has suggested that potential volunteers (i.e. people who are willing to volunteer in the future) could be considered a separate group, as they share individual characteristics, such as better health, with actual volunteers (Dury *et al.* 2014; Einolf 2011). Distinguishing potential volunteers may provide valuable information for the recruitment of volunteers (Dury *et al.* 2014).

Fifth, in all empirical chapters there was no consideration of the characteristics of the activities, such as the type of volunteering organisation, job characteristics, and caregiving tasks performed. For example, previous research showed that the effect of engagement in paid and unpaid activities on wellbeing varies according to feelings of reciprocity linked to the activity (McMunn *et al.* 2009; Zaninotto *et al.* 2013). Findings from ELSA showed that only those who felt rewarded for participating in caregiving, volunteering and paid work had higher wellbeing than those who did not engage in these activities (McMunn *et al.* 2009). Feelings of reciprocity may also be important for the relationship between paid work and engagement in caregiving and volunteering. Other job characteristics, such as autonomy, control and job strain may also be important when considering the effect of employment on engagement in unpaid activities (Siegrist *et al.* 2004). Future research could provide further insight into how paid work affects engagement in unpaid activities by considering these characteristics.

Sixth, missing data and attrition may affect the results, as for a long-unbalanced panel, with multiple waves, individuals who drop out from the sample, or have missing observations, may introduce bias in the estimates. However, all analyses shown in chapter six were performed using the Mplus software, which allows the implementation of FIML as an estimation procedure. Through this procedure, it is possible to use all available data, even where an individual may have incomplete data for certain variables. This estimation procedure allows the less restrictive MAR assumption, rather than the MCAR (Allison 2012; Enders & Bandalos 2001). Chapters seven and eight, use longitudinal WB-RE models that are an extension of the random effects model, which are robust to unbalanced panels with missing data. Random effects models also allow us to assume that data is MAR rather than MCAR (Carrière & Bouyer 2002; Hu *et al.* 1998; Laird 1988). Still, it is impossible to evaluate or test the MAR assumption. Therefore, the effect of attrition cannot be completely ruled out (Spratt *et al.* 2010; Sterne *et al.* 2009).

Seventh, while longitudinal analyses can be used to deal with issues such as confounding, reverse causality and selection effects, the findings are nevertheless using observational data, which cannot exhaustively address issues of causality. This is particularly important for chapters seven and eight that aim to identify the relationship between paid work and engagement in caregiving and volunteering. Obviously, in this study, participants were not randomly allocated to experimental and control groups, as would be done in a trial, which is generally considered the "gold standard" for assessing causality. This would be unfeasible given the topic of the research. However, in chapter seven and eight, the WB-RE models were used in order to address the issue of selection. The within-person estimates uses only information from people who change over time, in such a way that each individual becomes their own control. This, arguably, represents an approach which effectively addresses selection effects and provides insights into direct influences (Bell & Jones 2015b; Certo *et al.* 2017). Furthermore, time-lagged models have been used in order to eschew spurious relationships caused by reverse causality mechanisms. Future observational research may provide further insights into the causal relationship between engagement in paid work and unpaid activities by exploiting policies that extend working lives as natural experiments. Techniques such as difference-in-difference models may assess the causal effect of a policy on individuals' engagement in informal care and volunteer work in later life.

9.4 Policy implications and Conclusion

This thesis examined the relationship between paid and unpaid work in the years that precede and follow the SPA. It extended previous literature by exploring patterns of multiple paid and unpaid activities longitudinally, showing that, for each engagement pathway, patterns of unpaid work are characterised by stability within distinct paths of engagement. The findings suggested that individuals who work in full-time employment for longer have a lower probability of engagement in unpaid activities, even after leaving paid work. Pathways of engagement are highly gendered and related to socioeconomic and health characteristics. In addition, using WB-RE models on panel data, the findings presented in chapters seven and eight provided novel insights into the relationship between paid work and engagement in informal care provision and volunteering in later life. The results showed that paid work, particularly full-time employment, has a competing relationship with these

unpaid activities. The findings emphasise the importance of considering both direct influences and selection mechanisms.

These findings have important implications for societies that are currently experiencing substantial population ageing, where working lives in the paid labour market are predicted to become longer. There are several reasons that suggest that working lives are going to become longer in the future, and that a higher number of individuals will be working past statutory retirement ages (Scherger 2015). First, current and future cohorts that are currently entering traditional retirement ages are generally healthier and better educated than previous cohorts. Both factors are predictors of employment in later life (Lain 2015). Second, the number of working retirees may increase due to spill-over effects of policies that increased the age of eligibility for the state pension, as differences between the statutory and effective retirement ages have been decreasing in various countries, including the UK (Scherger 2015). Third, policies that affected pension incomes – e.g. changes from defined benefit to defined contribution systems – and restricted pathways for early retirement, may increase the number of people that need to work longer for financial reasons, although these policies may also exacerbate social and health inequalities. Fourth, cultural changes are expected to affect attitudes in regard to work in later life and retirement, as current generations of pensioners are expected to aspire for more from their retirement than solely a period of leisure (Gilleard & Higgs 2000). Ideologies, such as active and productive ageing, may impinge on these cultural changes by promoting the individualisation of the responsibility for achieving ideals of healthy and successful ageing (Moulaert & Biggs 2013). Finally, the demand for older workers is expected to rise as a result of larger cohorts reaching traditional retirement ages (Scherger 2015). Retaining older and more experienced workers may become a requirement in some sectors in order to avoid skills shortages (Scherger 2015).

Higher participation in the workforce in later life may have implications for engagement in unpaid forms of work. As shown by the research presented in chapters seven and eight, full-time paid work directly affects engagement in informal caregiving and volunteering, through within person effects. These findings suggest that longer working lives, in full-time employment in particular, may not be compatible with engagement in caregiving and volunteering. Extended working lives may affect the supply of informal caregivers and volunteers in the UK. This is

particularly concerning for informal care provision, as the social care system in the UK relies heavily on informal caregivers, and future demand for long term care is projected to increase considerably, as the number of people over the age of 85 with care needs is increasing substantially (Leitner 2003; Pickard 2015). Facilitating the combination of paid work and caregiving across the lifecourse could enable individuals to engage in a mixture of paid and unpaid work for longer, and encourage greater engagement with unpaid activities in mid to later life.

The recommendations proposed by John Cridland, in the independent review of the SPA, acknowledge the disadvantage suffered by carers in relation to policies that extend working lives (Cridland 2017, pp.62). The review emphasises that in order to "smooth the transition" into retirement, various measures to support carers should be implemented, including: recommending that employers develop eldercare policies; a Statutory Carers' Leave to better enable caregivers to provide emergency care when needed; and access to an early means-tested pension benefit, one year before the SPA, after the SPA is increased to 68 (Cridland 2017, pp.16-17).

While these recommendations acknowledge the difficulty of working longer for carers in particular, further measures should be considered. For example, the recommended pension benefit provided one year earlier than the SPA of 68 may not be enough support for caregivers, especially since the age group who are most likely to provide informal care are those in the 50-64 age group, according to the UK census (figure 2-7). This is considerably earlier than when they would be eligible for this early pension. According to the 2011 census, among people in the 50-64 age group, 5% and 7% of men and women respectively provided more than 20 hours of care per week, while 3% and 4% provided at least 50 hours (figure 2-9). Rather than providing flexibility for the SPA based on age boundaries (i.e. one year before 68), policies should consider acknowledging the heavy burden faced by some caregivers in mid to later life, who are unlikely to be able to remain in the labour market while providing high levels of informal care.

Research presented in chapter six also emphasises the importance of considering gender inequalities in the division of labour inside the household. Patterns of engagement in paid and unpaid work showed the persistence of the modified breadwinner family model, where women are more likely to work-part-time than men, and engage in unpaid work inside the household (van der Horst *et al.* 2017). Addressing gender inequalities in unpaid work carried out in the private

sphere, such as caregiving, childcare and housework tasks, may enable more women to participate in full-time employment for longer, alleviating the tension between paid and unpaid forms of work. Evidence from high income countries, including the UK, shows that the "gender revolution" has stalled, as progress in the advancement of gender equality has tapered off (Frejka *et al.* 2017; Thébaud & Pedulla 2016). For instance, while women have joined the paid workforce *en masse* during the second half of the twentieth century, the corresponding increase in the share of unpaid work done by men has only occurred to a limited extent (Frejka *et al.* 2017). Policies that extend working lives may therefore impact women more heavily, if a more equitable division of labour is not achieved.

Furthermore, in the context of the debates about changes in the organisation of the lifecourse structure (section 2.3.3), a more equitable division of unpaid labour may also be beneficial for men, especially in regard to health outcomes. For example, evidence from ELSA suggests that lifecourse trajectories characterised by family breaks from paid employment, rather than continuous full-time employment, lead to lower risk of frailty in later life (Lu *et al.* 2017). Therefore, policies that promote a gender equal division of unpaid labour, such as targeting parental leave policies to fathers', may improve health in later life (Duvander & Johansson 2012; Nandi *et al.* 2018).

Findings from chapter six, suggest that a majority of men, who followed the p*aid workers* pathway, are relegated into engagement in full-time work, with very low probabilities of engaging in any unpaid activity, including activities that may be beneficial for social integration in later life, such as volunteering and civic participation. Similar findings have also been reported in the HRS. A cross-sectional LCA showed that men are more likely to be classified into a low activity cluster, which was vulnerable to poor outcomes, rather than a moderate and high activity cluster (Morrow-Howell *et al.* 2014). At the same time, men were also more likely to be classified in the "working" group (Morrow-Howell *et al.* 2014). These findings might suggest that men with low attachment to unpaid labour may experience a transition into retirement leading to low engagement and poor wellbeing outcomes. Given current ideals of active and healthy ageing through the promotion of participation in society, the men who comprise the majority of the *paid workers* pathway, are at odds with these visions, with repercussions on their health and wellbeing. However, further research would be needed to verify this. Nevertheless,

lifecourses that allow more flexibility and a more equitable division of unpaid work may be beneficial for the promotion of higher engagement in paid and unpaid work in later life (Künemund & Scherger 2015).

Finally, findings also emphasise social selection as a mechanism that affects engagement in unpaid forms of work in later life. Chapters seven and eight show that between estimates are also significant, after covariates are adjusted for, in predicting that full-time employment affects engagement in volunteering and informal care provision. Therefore, selection effects may be affecting those who are in full-time employment, as they may be less likely to engage in unpaid activity to begin with. While findings in chapter six suggest that paid work and engagement in unpaid work are competing activities, within each pathway when the probability of participating in full-time paid work decreases, the probability for engagement in unpaid work is mostly constant from age 55 to 70. Paid and unpaid activities may be competing for individuals' time earlier in the lifecourse, as established patterns of engagement are then mostly continued into mid and later life. Prior participation in full-time employment and prior engagement in unpaid work may predict pathways of engagement in mid to later life. Those who are more engaged in unpaid forms of work throughout the lifecourse are unlikely to increase their participation in full-time work in later life, either due to time restrictions or because of weaker labour market attachment.

This emphasises the importance of taking a lifecourse perspective for active ageing related initiatives. As shown by within-person estimates (chapters seven and eight) full-time employment has a direct influence on engagement in caregiving and volunteering, whereby one might expect that removal of full-time employment may lead to increased engagement in these unpaid activities. However, the fact that between person estimates are significant for paid work, and seem to mediate the effects of part-time and self-employment, suggests that initiatives and policies should also act on upstream factors, located earlier in the lifecourse.

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Appendix A.

Sensitivity analyses for the relationship between paid work and caregiving (chapter seven)

Tables A1 and table A2, show the WB-RE models for the odds of caregiving on a monthly and weekly basis, respectively. These tables compare the estimates from the full harmonised samples of the BHPS (waves: 1-18) and UKHLS (waves 2 to 7), and of the BHPS only (waves: 1-18). The table show the unadjusted and the fully adjusted relationship, controlling for age, age squared cohort, marital status, education, tenure, subjective financial situation, income, self-rated health and GHQ score. The results show that there are no conspicuous differences between the BHPS+UKHLS and the BHPS only estimates (tables A1-1 and table A2). The main difference are the larger confidence intervals in the BHPS only estimates, as a result of the smaller sample. While some estimates become non-significant for the BHPS only estimates, inspection of the confidence interval demonstrates that the results are not qualitatively different.

Tables A3 and table A4 compare unweighted and weighted analyses. The weight used in these analyses adjust for household and individual non-response, from 2001 BHPS wave to the 2015 UKHLS wave. These weights include also the booster samples from Northern Ireland, Wales and Scotland, in order to produce estimates representative of the UK. It should be noted that a somewhat different estimation procedure was used, as the *xthybrid* Stata command, for the implementation of WB-RE models, does not allow the use of weights. Multilevel models were implemented with the *melogit* Stata command, inputting meaned and demeaned variables manually, in order to obtain within person and between person estimates. Therefore, unweighted estimates in table A3 and table A4 are slightly different from estimates in chapter seven (section 7.3, tables 7-2 and 7-3). Results show that there are no significant differences between weighted and unweighted estimates, aside from between person estimates for women in table A3. The weighted odds ratios for part-time and full-time self-employment show stronger effects than the unweighted ones.

Table A1 Odds of caregiving (any). Comparison of full and BHPS only samples

	Men							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.21	0.78,1.86	1.17	0.69,1.97	1.08	0.70,1.68	1.07	0.63,1.81
SE full -time	1.11	0.87,1.42	0.90	0.66,1.23	0.95	0.73,1.24	0.82	0.59,1.13
Part-time	1.04	0.77,1.39	0.85	0.60,1.20	0.97	0.72,1.31	0.82	0.57,1.17
Full-time	0.81**	0.70,0.93	0.68***	0.57,0.82	0.70***	0.58,0.84	0.62***	0.50,0.77
BP - Paid work[a]								
SE part-time	1.05	0.30,3.63	1.13	0.27,4.81	0.70	0.20,2.46	0.78	0.18,3.39
SE full -time	0.68*	0.48,0.97	0.70	0.47,1.03	0.47***	0.32,0.69	0.49**	0.32,0.75
Part-time	1.54	0.73,3.26	1.44	0.63,3.26	1.25	0.58,2.68	1.13	0.49,2.59
Full-time	0.64***	0.50,0.83	0.70*	0.52,0.92	0.40***	0.30,0.55	0.44***	0.31,0.62
N (observations)	24,901		19,340		24,901		19,340	
n (individuals)	3,981		3,411		3,981		3,411	
	Women							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.13	0.78,1.63	1.10	0.68,1.78	0.95	0.65,1.38	0.95	0.58,1.54
SE full -time	1.24	0.84,1.82	1.26	0.76,2.09	0.94	0.64,1.40	1.07	0.64,1.79
Part-time	1.09	0.92,1.29	0.91	0.74,1.12	0.86	0.72,1.03	0.77*	0.62,0.95
Full-time	0.97	0.84,1.12	0.79*	0.65,0.95	0.70***	0.59,0.82	0.62***	0.51,0.77
BP - Paid work[a]								
SE part-time	1.85	0.64,5.35	1.67	0.47,5.93	1.18	0.40,3.49	1.15	0.32,4.20
SE full -time	1.39	0.73,2.65	1.47	0.70,3.10	0.79	0.41,1.53	0.78	0.36,1.68
Part-time	1.27	0.84,1.90	1.43	0.92,2.23	0.83	0.55,1.26	0.90	0.57,1.43
Full-time	1.11	0.86,1.43	1.18	0.88,1.57	0.63**	0.47,0.86	0.68*	0.48,0.95
N (observations)	29,819		22,919		29,819		22,919	
n (individuals)	4,609		3,980		4,609		3,980	

Table A2 Odds of caregiving (at least 20 hours per week). Comparison of full and BHPS only samples

	Men							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.72	0.26,2.00	0.65	0.20,2.12	0.73	0.26,2.07	0.66	0.18,2.35
SE full -time	0.76	0.43,1.34	0.68	0.34,1.37	0.87	0.48,1.60	0.73	0.33,1.59
Part-time	0.20***	0.10,0.42	0.13***	0.05,0.33	0.22***	0.10,0.47	0.12***	0.04,0.34
Full-time	0.28***	0.20,0.39	0.34***	0.22,0.52	0.35***	0.24,0.53	0.37***	0.22,0.62
BP - Paid work[a]								
SE part-time	0.06	0.00,3.66	0.11	0.00,3.22	0.06	0.00,4.73	0.14	0.00,20.78
SE full -time	0.20***	0.09,0.48	0.12***	0.04,0.31	0.21***	0.09,0.50	0.14***	0.04,0.42
Part-time	0.53	0.13,2.16	0.34	0.07,1.67	0.77	0.19,3.15	0.54	0.11,2.76
Full-time	0.08***	0.04,0.17	0.07***	0.04,0.16	0.08***	0.04,0.16	0.06***	0.02,0.15
N (observations)	24,901		19,340		24,901		19,340	
n (individuals)	3,981		3,411		3,981		3,411	
	Women							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.62	0.25,1.51	0.66	0.18,2.36	0.58	0.23,1.44	0.68	0.19,2.46
SE full -time	0.67	0.31,1.45	1.05	0.41,2.71	0.62	0.29,1.35	1.02	0.39,2.66
Part-time	0.56***	0.40,0.77	0.42***	0.28,0.63	0.53***	0.38,0.74	0.41***	0.27,0.61
Full-time	0.55***	0.42,0.73	0.52***	0.36,0.73	0.50***	0.37,0.69	0.49***	0.33,0.72
BP - Paid work[a]								
SE part-time	0.08*	0.01,0.89	0.08	0.00,1.78	0.07*	0.01,0.76	0.07	0.00,1.41
SE full -time	0.35	0.10,1.21	0.17	0.02,1.21	0.27*	0.08,0.94	0.14*	0.02,0.89
Part-time	0.63	0.34,1.17	0.71	0.37,1.39	0.45*	0.24,0.85	0.50	0.25,1.01
Full-time	0.34***	0.22,0.52	0.36***	0.22,0.60	0.24***	0.15,0.39	0.28***	0.16,0.49
N (observations)	29,819		22,919		29,819		22,919	
n (individuals)	4,609		3,980		4,609		3,980	

Table A3 Odds of caregiving (any). Comparison of unweighted and weighted analyses

	Men							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.23	0.80,1.89	1.21	0.45,3.23	1.10	0.71,1.70	1.17	0.43,3.13
SE full -time	1.12	0.87,1.43	1.19	0.68,2.06	0.95	0.73,1.24	1.11	0.63,1.97
Part-time	1.03	0.77,1.39	1.07	0.56,2.05	0.97	0.71,1.31	1.02	0.53,1.96
Full-time	0.81**	0.70,0.93	0.68*	0.48,0.98	0.70***	0.58,0.84	0.61*	0.41,0.90
BP - Paid work[a]								
SE part-time	0.89	0.25,3.23	1.74	0.24,12.39	0.59	0.16,2.20	1.77	0.24,13.04
SE full -time	0.68*	0.48,0.97	0.33**	0.16,0.66	0.47***	0.32,0.69	0.34**	0.17,0.71
Part-time	1.57	0.74,3.31	2.91	0.83,10.15	1.27	0.59,2.72	2.70	0.77,9.47
Full-time	0.64***	0.50,0.83	0.50**	0.31,0.78	0.40***	0.29,0.55	0.50*	0.29,0.86
N (observations)	24,901		9,754		24,901		9,754	
n (individuals)	3,981		1,111		3,981		1,111	

	Women							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.13	0.78,1.63	1.62	0.87,3.04	0.95	0.65,1.38	1.35	0.71,2.58
SE full -time	1.24	0.84,1.82	1.24	0.57,2.70	0.94	0.63,1.39	0.86	0.43,1.74
Part-time	1.08	0.91,1.28	1.03	0.68,1.54	0.85	0.71,1.02	0.75	0.50,1.14
Full-time	0.97	0.84,1.12	0.95	0.66,1.37	0.70***	0.59,0.82	0.61*	0.41,0.90
BP - Paid work[a]								
SE part-time	1.81	0.63,5.21	5.23*	1.44,19.06	1.14	0.39,3.35	3.80*	1.00,14.34
SE full -time	1.39	0.73,2.66	0.33*	0.12,0.94	0.80	0.41,1.55	0.23**	0.08,0.69
Part-time	1.31	0.87,1.97	0.89	0.49,1.61	0.86	0.56,1.31	0.70	0.37,1.30
Full-time	1.10	0.86,1.42	0.82	0.54,1.24	0.63**	0.46,0.85	0.64	0.40,1.02
N (observations)	29,819		12,626		29,819		12,626	
n (individuals)	4,609		1,411		4,609		1,411	

Table A4 Odds of caregiving (at least 20 hours per week). Comparison of unweighted and weighted analyses

	Men							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.72	0.26,2.00	0.56	0.09,3.75	0.74	0.26,2.07	0.52	0.05,5.27
SE full -time	0.77	0.43,1.35	0.58	0.24,1.39	0.89	0.48,1.62	0.67	0.22,1.99
Part-time	0.20***	0.10,0.42	0.31	0.09,1.04	0.22***	0.10,0.47	0.30	0.09,1.03
Full-time	0.28***	0.20,0.39	0.30**	0.14,0.63	0.35***	0.24,0.53	0.28**	0.11,0.70
BP - Paid work[a]								
SE part-time	0.06	0.00,3.72	0.06	0.00,24.04	0.06	0.00,4.80	0.11	0.00,32.24
SE full -time	0.19***	0.08,0.47	0.25	0.06,1.04	0.20***	0.08,0.48	0.26	0.06,1.08
Part-time	0.52	0.13,2.15	2.24	0.49,10.31	0.77	0.19,3.18	3.46	0.66,18.26
Full-time	0.08***	0.04,0.17	0.17***	0.06,0.46	0.08***	0.04,0.16	0.17***	0.06,0.49
N (observations)	24,901		9,754		24,901		9,754	
n (individuals)	3,981		1,111		3,981		1,111	

	Women							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.62	0.26,1.52	0.97	0.31,3.02	0.58	0.23,1.44	0.86	0.26,2.80
SE full -time	0.68	0.32,1.45	0.36	0.05,2.67	0.62	0.28,1.34	0.33	0.06,1.99
Part-time	0.56***	0.40,0.77	0.49	0.24,1.02	0.53***	0.38,0.74	0.42*	0.20,0.86
Full-time	0.55***	0.42,0.72	0.62	0.35,1.10	0.50***	0.37,0.69	0.48*	0.25,0.90
BP - Paid work[a]								
SE part-time	0.08*	0.01,0.86	0.12	0.00,3.64	0.07*	0.01,0.73	0.16	0.01,4.88
SE full -time	0.35	0.10,1.21	0.39	0.08,1.95	0.28*	0.08,0.95	0.33	0.06,1.73
Part-time	0.63	0.34,1.17	0.33	0.11,1.05	0.45*	0.24,0.86	0.31*	0.10,0.99
Full-time	0.34***	0.22,0.52	0.21***	0.10,0.42	0.24***	0.15,0.40	0.19***	0.09,0.43
N (observations)	29,819		12,626		29,819		12,626	
n (individuals)	4,609		1,411		4,609		1,411	

Appendix B.

Sensitivity analyses for the relationship between paid work and volunteering (chapter eight)

Tables B1 to table B4 show the sensitivity analysis for volunteering. Similarly to appendix A, tables B1 and B2 compare the estimates from the full harmonised samples of the BHPS (waves: 6, 8, 10, 2, 14, 16, 18) and UKHLS (waves 2, 4 ,6), and of the BHPS only (waves: 6, 8, 10, 2, 14, 16, 18). This comparison is particularly important for volunteering given that, the question for volunteering is somewhat different in the UKHLS. The results from the two samples are not significantly different, as the qualitative interpretation of the estimates would remain the same. The main difference are the larger confidence intervals in the BHPS only estimates, as a result of the smaller sample.

Tables B3 and B4 compare the weighted and unweighted analyses. The same method used for appendix A, was used to produce the results in tables B3 and B4. The results from the weighted and unweighted analyses are not meaningfully different. The main difference is that confidence intervals become larger as a result of the smaller sample size in the weighted analyses. As explained in appendix A, a different estimation procedure was used to produce the estimates in tables B3 and B4. Therefore, the unweighted estimates are slightly different from the estimates presented in chapter eight (section 8.3, tables 8-2 and 8-3)

Table B1 Odds of volunteering (monthly). Comparison of full and BHPS only samples

	Men							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.06	0.48,2.35	1.24	0.46,3.31	0.98	0.44,2.15	1.05	0.39,2.77
SE full -time	0.68	0.42,1.12	1.03	0.53,1.98	0.71	0.42,1.20	0.84	0.43,1.67
Part-time	0.96	0.56,1.66	1.15	0.60,2.20	0.92	0.53,1.59	0.98	0.51,1.87
Full-time	0.43***	0.32,0.59	0.34***	0.23,0.53	0.42***	0.29,0.61	0.27***	0.17,0.44
BP - Paid work[a]								
SE part-time	22.18**	3.30,148.98	58.54***	5.54,618.62	7.88*	1.20,51.67	15.38*	1.62,146.00
SE full -time	1.30	0.74,2.27	1.10	0.59,2.07	0.95	0.51,1.76	0.91	0.45,1.83
Part-time	7.16***	2.43,21.09	5.82**	1.85,18.31	3.19*	1.07,9.56	2.87	0.88,9.34
Full-time	0.72	0.47,1.09	0.62	0.38,1.00	0.49**	0.28,0.83	0.45**	0.24,0.82
N (observations)	10,836		8,032		10,836		8,032	
n (individuals)	3,177		2,706		3,177		2,706	

	Women							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.77	0.39, 1.52	0.82	0.33,2.04	0.75	0.38,1.48	0.80	0.32,2.01
SE full -time	0.31**	0.15, 0.63	0.59	0.22,1.58	0.29***	0.14,0.60	0.58	0.22,1.58
Part-time	0.77	0.55, 1.09	0.76	0.50,1.16	0.74	0.52,1.06	0.73	0.47,1.14
Full-time	0.32***	0.24, 0.43	0.33***	0.23,0.49	0.31***	0.22,0.43	0.35***	0.23,0.53
BP - Paid work[a]								
SE part-time	8.66**	2.28, 2.95	5.33*	1.12,25.40	3.85*	1.05,14.11	2.68	0.57,12.62
SE full -time	2.23	0.96, 5.19	1.54	0.57,4.12	0.98	0.42,2.28	0.78	0.28,2.12
Part-time	1.19	0.68, 2.09	1.02	0.55,1.89	0.91	0.51,1.64	0.80	0.42,1.53
Full-time	0.33***	0.22, 0.50	0.36***	0.23,0.56	0.20***	0.12,0.32	0.22***	0.13,0.37
N (observations)	13,029		9,543		13,029		9,543	
n (individuals)	3,690		3,163		3,690		3,163	

Table B2 Odds of volunteering (weekly). Comparison of full and BHPS only samples

	Men							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.92	0.39,2.15	1.38	0.48,3.96	0.87	0.37,2.01	1.17	0.41,3.32
SE full -time	0.79	0.45,1.38	1.36	0.64,2.88	0.87	0.48,1.56	1.10	0.51,2.38
Part-time	0.67	0.37,1.21	0.80	0.39,1.64	0.68	0.37,1.24	0.68	0.33,1.40
Full-time	0.33***	0.23,0.46	0.28***	0.17,0.47	0.36***	0.24,0.55	0.23***	0.13,0.40
BP - Paid work[a]								
SE part-time	12.26**	1.96,76.75	14.82*	1.62,135.48	4.84	0.73,32.06	5.10	0.53,48.71
SE full -time	0.87	0.45,1.66	1.01	0.49,2.08	0.53	0.26,1.06	0.71	0.32,1.55
Part-time	5.77**	1.98,16.85	3.61*	1.07,12.14	2.68	0.88,8.14	1.58	0.43,5.83
Full-time	0.73	0.45,1.17	0.47*	0.26,0.86	0.40**	0.23,0.72	0.28***	0.14,0.57
N (observations)	10,836		8,032		10,836		8,032	
n (individuals)	3,177		2,706		3,177		2,706	
	Women							
	Unadjusted models				Fully adjusted models			
	BHPS & UKHLS		BHPS only		BHPS & UKHLS		BHPS only	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.52	0.24,1.14	0.43	0.14,1.36	0.50	0.23,1.10	0.42	0.13,1.34
SE full -time	0.12***	0.05,0.28	0.10***	0.03,0.36	0.12***	0.05,0.29	0.10***	0.03,0.38
Part-time	0.45***	0.30,0.68	0.42***	0.25,0.70	0.48***	0.31,0.72	0.43**	0.26,0.73
Full-time	0.23***	0.16,0.32	0.22***	0.14,0.36	0.26***	0.17,0.38	0.27***	0.16,0.46
BP - Paid work[a]								
SE part-time	3.46	0.88,13.51	1.29	0.22,7.48	1.97	0.50,7.80	0.75	0.12,4.56
SE full -time	0.96	0.36,2.51	0.58	0.17,1.98	0.50	0.19,1.33	0.34	0.10,1.17
Part-time	0.80	0.42,1.54	0.90	0.44,1.83	0.65	0.33,1.28	0.77	0.37,1.60
Full-time	0.30***	0.18,0.48	0.28***	0.16,0.49	0.21***	0.12,0.35	0.21***	0.11,0.38
N (observations)	13,029		9,543		13,029		9,543	
n (individuals)	3,690		3,163		3,690		3,163	

Table B3 Odds of volunteering (monthly). Comparison of unweighted and weighted analyses

	Men							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	1.02	0.47,2.20	1.67	0.41,6.77	0.94	0.44,2.04	1.73	0.42,7.16
SE full -time	0.66	0.41,1.07	1.20	0.49,2.97	0.68	0.41,1.13	1.39	0.56,3.46
Part-time	0.98	0.58,1.67	0.86	0.35,2.13	0.96	0.56,1.64	0.88	0.35,2.20
Full-time	0.43***	0.31,0.58	0.50*	0.29,0.88	0.41***	0.29,0.60	0.52*	0.28,0.97
BP - Paid work[a]								
SE part-time	71.79***	9.10,566.01	8.75	0.68,112.74	15.56**	2.07,117.09	2.07	0.16,26.94
SE full -time	1.39	0.79,2.45	0.55	0.25,1.19	1.04	0.56,1.93	0.51	0.20,1.26
Part-time	9.03***	2.69,30.28	8.56*	1.52,48.28	3.13	0.90,10.84	3.54	0.55,22.72
Full-time	0.80	0.52,1.24	0.46*	0.26,0.84	0.54*	0.31,0.93	0.36**	0.17,0.77
N (observations)	10,836		5,033		10,836		5,033	
n (individuals)	3,177		1,110		3,177		1,110	

	Women							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.72	0.37,1.41	1.18	0.40,3.48	0.73	0.37,1.42	1.32	0.46,3.80
SE full -time	0.31**	0.16,0.63	0.37	0.07,1.84	0.30***	0.15,0.61	0.35	0.07,1.89
Part-time	0.75	0.54,1.04	0.72	0.40,1.29	0.72	0.51,1.02	0.81	0.44,1.47
Full-time	0.31***	0.23,0.41	0.23***	0.12,0.43	0.30***	0.21,0.41	0.27***	0.14,0.53
BP - Paid work[a]								
SE part-time	17.75***	4.22,74.63	15.71**	2.38,103.68	5.80*	1.45,23.15	7.74*	1.33,45.11
SE full -time	2.11	0.87,5.12	0.55	0.16,1.84	0.95	0.39,2.33	0.46	0.14,1.57
Part-time	1.42	0.79,2.55	0.86	0.37,1.98	1.04	0.57,1.91	0.71	0.30,1.68
Full-time	0.36***	0.24,0.55	0.23***	0.13,0.43	0.21***	0.13,0.34	0.22***	0.11,0.45
N (observations)	13,029		6,493		13,029		6,493	
n (individuals)	3,690		1,419		3,690		1,419	

Table B4 Odds of volunteering (weekly). Comparison of unweighted and weighted analyses

	Men							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.88	0.38,2.00	0.83	0.21,3.22	0.82	0.36,1.88	0.75	0.19,3.00
SE full -time	0.76	0.44,1.31	0.96	0.36,2.52	0.81	0.45,1.43	1.06	0.38,2.98
Part-time	0.66	0.37,1.18	0.70	0.32,1.55	0.68	0.38,1.22	0.69	0.30,1.59
Full-time	0.33***	0.23,0.47	0.45**	0.26,0.78	0.36***	0.24,0.54	0.48*	0.24,0.94
BP - Paid work[a]								
SE part-time	33.94***	4.72,244.08	5.49	0.46,65.90	8.40*	1.14,61.84	1.52	0.13,17.47
SE full -time	0.90	0.47,1.74	0.25*	0.09,0.74	0.58	0.29,1.16	0.20**	0.06,0.65
Part-time	9.37***	2.83,31.02	9.84*	1.66,58.29	3.55*	1.03,12.23	4.64	0.69,31.28
Full-time	0.78	0.47,1.28	0.57	0.29,1.13	0.43**	0.24,0.78	0.38*	0.17,0.88
N (observations)	10,836		5,033		10,836		5,033	
n (individuals)	3,177		1,110		3,177		1,110	
	Women							
	Unadjusted models				Fully adjusted models			
	Unweighted		Weighted		Unweighted		Weighted	
	OR	CI	OR	CI	OR	CI	OR	CI
WP - Paid work[a]								
SE part-time	0.48	0.22,1.04	0.52	0.22,1.25	0.48	0.22,1.03	0.57	0.24,1.37
SE full -time	0.12***	0.05,0.28	0.07***	0.02,0.30	0.12***	0.05,0.28	0.07***	0.02,0.35
Part-time	0.43***	0.29,0.64	0.49*	0.26,0.91	0.46***	0.31,0.69	0.58	0.31,1.11
Full-time	0.22***	0.16,0.31	0.14***	0.07,0.27	0.25***	0.17,0.37	0.19***	0.09,0.39
BP - Paid work[a]								
SE part-time	5.93*	1.40,25.08	7.17*	1.08,47.37	2.73	0.64,11.63	3.89	0.58,26.15
SE full -time	0.99	0.36,2.72	0.38	0.07,1.94	0.53	0.19,1.49	0.35	0.07,1.77
Part-time	0.97	0.50,1.89	0.56	0.22,1.39	0.77	0.38,1.52	0.48	0.18,1.26
Full-time	0.32***	0.20,0.52	0.20***	0.10,0.40	0.22***	0.13,0.38	0.20***	0.09,0.45
N (observations)	13,029		6,493		13,029		6,493	
n (individuals)	3,690		1,419		3,690		1,419	